

THE IRON AGE

New York, Thursday, June 27, 1907.

THE NEW PRATT & WHITNEY TURRET LATHE.

A machine capable of handling both bar stock and castings and performing a greater variety of work than any other of its type, was sought when the Pratt & Whitney Company, Hartford, Conn., designed the open turret lathe herewith illustrated. It is a $2\frac{1}{2}$ x 26 in. size, or in other words handles $2\frac{1}{2}$ in. bar stock 26 in. long, and will take castings up to 14 in. in diameter. Several new features in its construction were prompted by the desire to avoid continually making special appliances and cutting tools, and to increase the convenience and rapidity of making ready for a job so that small lots of work can be handled economically. Much of the work now done in ordinary turret and engine lathes, it is believed, can be

shaft at one time. The gears are extra strong and run continually in oil. In addition, the various spindle bearings are independently lubricated from the inside. The friction clutches have means for conveniently taking up any wear. The head is bolted to the bed, and no complicated means of supporting bars being machined or of connecting motor drives are necessitated. The motor may be bolted directly to the top of the head or placed elsewhere and connected by belt to the machine. Eight variations of speed are obtainable, which are sufficient in most cases, but a two-speed countershaft doubles this range.

The rod chuck is operated by a lever and a swinging link as shown in Fig. 1. It has extraordinary gripping

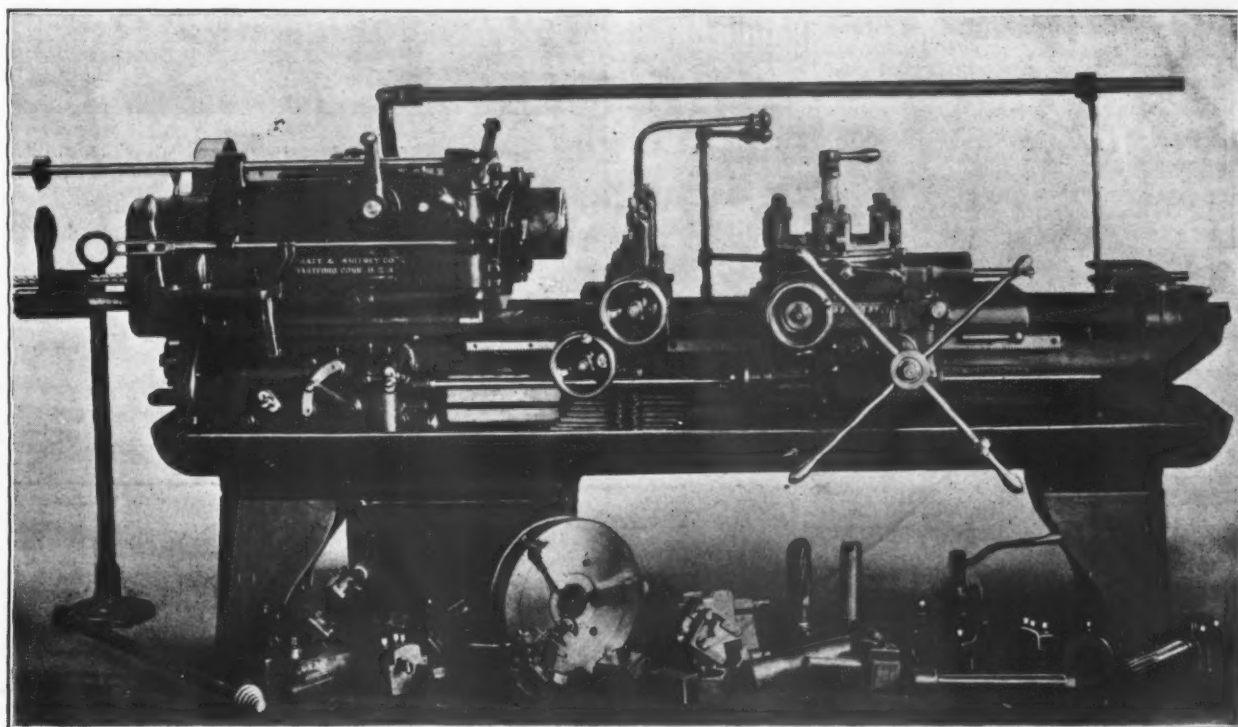


Fig. 1.—The New $2\frac{1}{2}$ x 26 In. Turret Lathe Built by the Pratt & Whitney Company, Hartford, Conn.

more advantageously performed in this tool. Its extreme rigidity, powerful spindle drive, quick changes of speeds and feeds, heavy cross feed turret, and numerous adjustable stops, enable it to do more accurate and rapid work than an engine lathe, while it has all of the flexibility and adaptability of the latter. Fig. 1 gives a general view of the lathe with most of its various attachments.

The work holding spindle is unusually heavy and of special steel, and runs in bronze split sleeves externally tapered to fit conical seats in the head, allowing compensation for spindle wear. The thrust of the spindle is taken by a part of the head casting, and here also provision is made for taking up wear. The spindle is ground and lapped, and its front end is ground externally and internally while running in its own bearings.

The drive, from a constant speed single belt pulley, is clearly shown in Fig. 2, which is a top view of the head with the cover removed. The direction and variation of the speeds of the work holding spindle are obtained by levers operating friction clutches, so as to connect any desired train of gears. The clutches are keyed to their shafts, and are operated through revolving grooved cams so constructed that it is possible to connect only one set of gearing between the work spindle and main driving

power, and its various parts, which are shown unassembled in Fig. 3, are ground. The collet jaws are supported up to their outer ends, which is particularly desirable in forming work from the cross slide. Another feature is the releasing action, which is readily understood from Fig. 4. Adjustment for different diameters is by means of the threading ring A. To remove the jaws, the outer ring B is moved to the left, and ring A unscrewed a few turns. The lever which opens and closes the jaws also controls the rod feeding device. The complete chuck can be readily removed from the spindle when the combination lathe chucks or special face plates are to be substituted.

The positive screw feeding device for automatically feeding the rod forward to its stop is the same as has been used in the Pratt & Whitney turret lathes for several years. The bar that is to be fed may be round, square, hexagon or any irregular cross section, and need not be free from scale. A sectional drawing of the device, as applied to this lathe, is given in Fig. 5. Under working conditions its operation is as follows:

When the lever opening the collet jaws has operated by means of a long connecting link, the clutch A and the coarse pitch feeding screw B are moved to the right, engaging the clutch on the face of the gear C, which is in

direct mesh with the gear D, on the rear end of the work spindle; this gear rotates in one direction only. As soon as the clutch is engaged the feeding screw rotates, causing the rod follower C to bring the bar of stock forward. The movement of the bar is arrested by an adjustable swinging stop on the front of the head. This halts the follower D, and the continued revolving of the feeding screw B, withdraws the clutch A, from the gear C. When the follower bar has moved its full distance, *i. e.*, 26 in., the lever F is moved to shift the clutch and feed screw to the left, engaging a gear operating in the reverse direction, thus returning the follower to its original position, where it becomes automatically disengaged similarly as in its forward movement. A follower bar is furnished which enables short pieces of stock to be as conveniently

moving locking bolt is superior to one moving vertically, in that it has no tendency to lift the turret from its seat. In addition to side gibs, there are two straps for preventing lifting. The construction also permits the use of a long, heavy spring, for positively locating the turret. The lock bolt engages directly under the cutting tool. The means for withdrawing the lock bolt and indexing the turret do not require any overhanging bars or greater floor space than that taken by the bed. The indexing is automatic at all positions of the cross slide or the turret may be rotated by hand.

Possibly the most important new feature is the power feed, compound turret slide and its conveniently located stops, which may be seen in Fig. 1, and also in Figs. 6 and 7. The longitudinal turret slide travels on Vs and

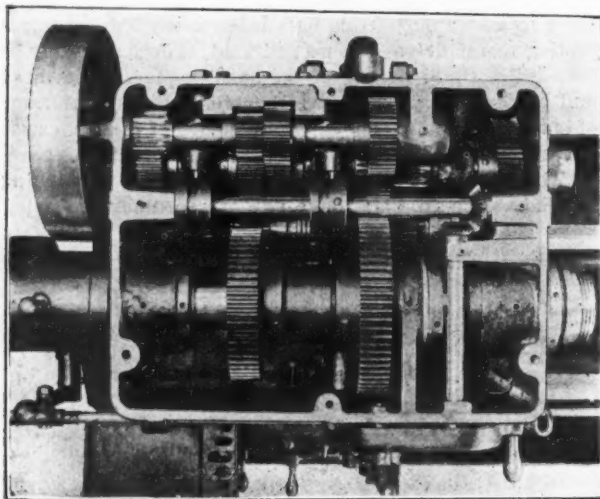


Fig. 2.—A Top View of the Head with Cover Removed.

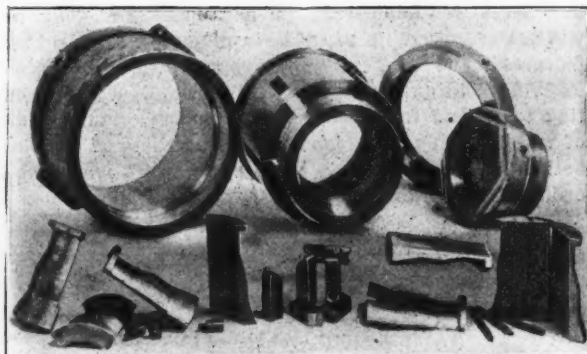


Fig. 3.—The Unassembled Parts of the Rod Chuck.

is provided with gibs its full length, and also with a binder for clamping it to the bed at any point. This is convenient when using the cross slide for forming or while cutting off stock. The power longitudinal feed is

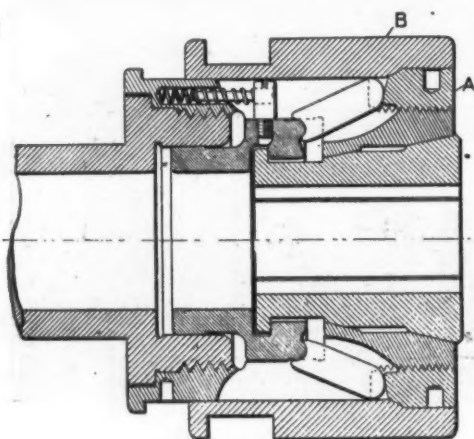


Fig. 4.—Section of the Rod Chuck.

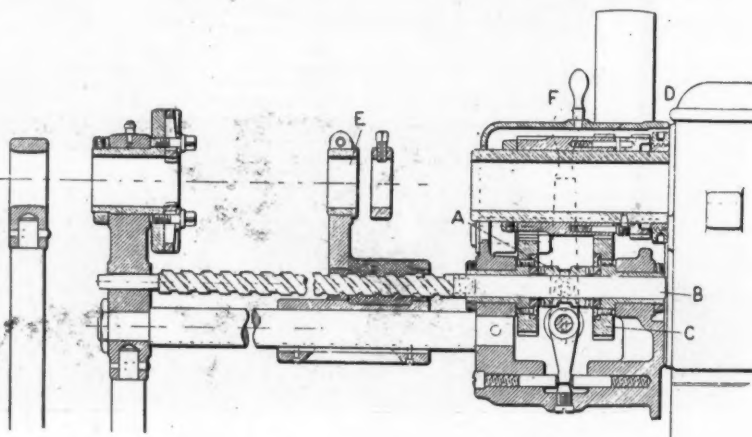


Fig. 5.—Section of the Rod Feeding Mechanism.

handled as long bars, and at the same time serves to keep such pieces concentric with the spindle.

The stock stop for gauging the length of stock is shown in Fig. 1, and consists of a stiff swinging member mounted on a bar moving longitudinally in uprights, cast solid with the head stock. An adjustable clamping ring determines the forward position of this stop. When not in use the stop is moved forward and swung upward, so as not to interfere with the turret tools.

The form of the turret favors precise locating of the various tools and their rigid backing, so that during heavy cuts, facing, &c., spring or backward movement is prevented. The rigid binding device, which clamps the revolving turret to its base, permits long bars to pass through it, and is a distinctive feature of Pratt & Whitney lathes. The stiffness without clumsiness, which is obtained in this turret, is a feature strongly emphasized. The turret proper revolves about a large central conical stud firmly held in the cross slide. The locking bolt is horizontal, large, hardened and ground, and is accurately fitted to the cross slide with means for taking up wear, without disturbing any other member. This horizontal

positive, the feed shaft being driven direct by gearing from the work spindle in both directions. Six variations are afforded, controlled by levers operating sliding keys which permit changes without stopping the work spindle.

The carriage has an apron carrying a system of worm and spur gears, the latter meshing with an inverted rack. Six automatic longitudinal stops and six supplementary stops, all adjustable for length, give two positions to each turret tool. When necessary all 12 stops may be used for one or all tools in the turret, and the possible combinations effectively cover all requirements. The stops are held in a bracket adjustable along the front of the bed. The turret base is a cam, and the roller follower is a rack, which, through a pinion and shaft, &c., swings the arm. The latter is always backed up by the knock-off block, so that any pressure put on the arm by power or by the operator is transferred to it, avoiding any tendency to spring the lighter parts of the stop mechanism. The cam is so formed as to cause the arm to swing in line with the six automatic stops in the bracket. By releasing a locking bolt the arm may be swung in line with any of the automatic or supple-

mentary stops. Both series of stops work in conjunction with the power feed and cause the knock-off block to stop the longitudinal slide at the point set. The power feed may also be disengaged by moving the lever on the apron to the right. The gearing in the apron runs continually in oil. The supplementary stops are very useful when it is desired to run through a few special pieces, as they may be used instead of and without disturbing the regular stop adjustments.

The extreme stiffness of the slide allows exceptionally long turret boring bars to be successfully used. By gearing there is sufficient leverage in the feeding of the turret slide forward by a star wheel to take heavy face cuts. The backward movement of the slide is limited, according to the work, by an adjustable back stop.

The turret cross slide is fitted to the longitudinal slide with liberal bearing surface. A narrow dovetail guide, with means of taking up wear, accurately retains

The central position of the turret is frequently required, especially for drills, reamers, dies and taps. That its position may be accurately and quickly obtained, a large bronze nut is secured to the cross slide base into which its screw fits, and in moving the slide to its central position this nut is brought against a stop plug held against endwise movement in the bottom slide.

A geared oil pump delivers a continuous flow of lubricant through flexible piping directly over the cutting tool. The turret is also arranged for internal lubrication of drills, counterbores, &c. Adjustable stock supporting bands, with revolving supporting jaws accompany each machine and prevent unnecessary noise and preserve corners on square and hexagon stock. A cross slide is furnished to order, which is used on the bed between the turret and head for heavy cross forming, generally on bars or small castings. It has cross and longitudinal hand movements. When using the turret close to the

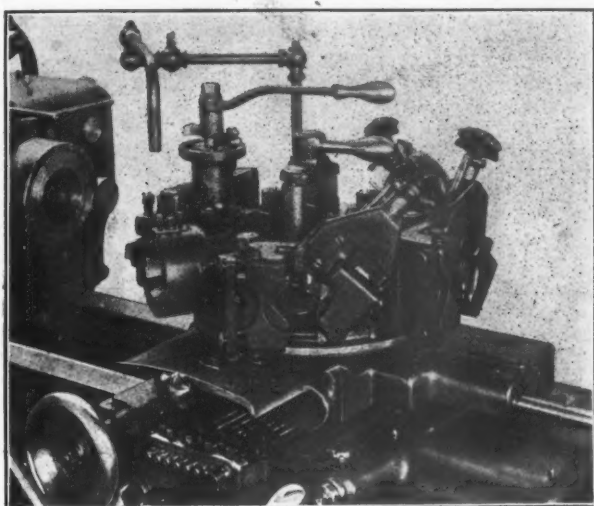


Fig. 6.—The Turret with a Typical Equipment of Tools.

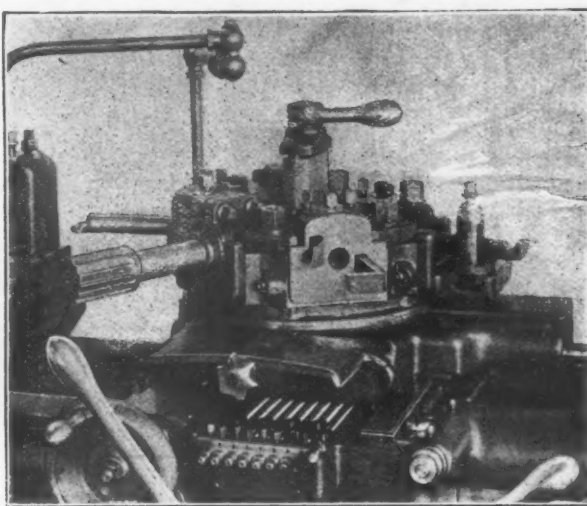


Fig. 7.—Another and Entirely Different Equipment of the Turret.

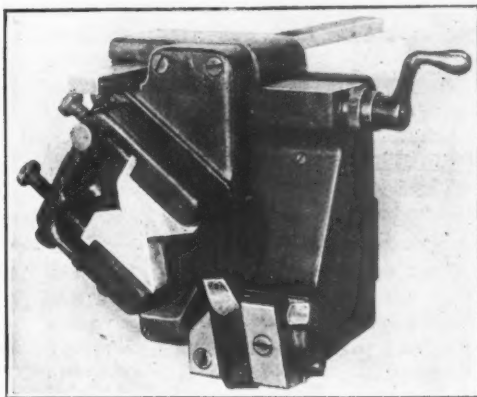


Fig. 8.—The Taper Turning Tool.

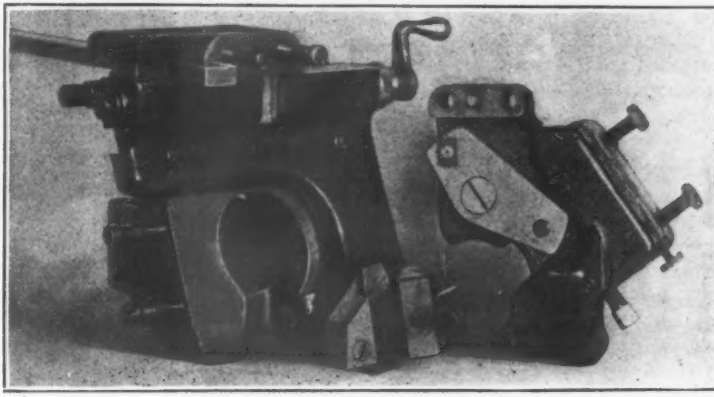


Fig. 9.—The Taper Turning Tool with the Back Rest Removed.

correct alignment. Under working conditions the cross slide is firmly held to the longitudinal slide by a strap extending its width, which overcomes any tipping tendency when using long boring bars or similar tools. It is so constructed as to permit the facing of the large diameter of castings with ordinary lathe tools, and using one set of turning and boring bars with simple inserted cutters for turning and facing varying diameters. Both hand and power feed are provided, and the six variations of the latter may be used in either direction. Eight adjustable cross stops may be used in any combination desired with the turret tools. In addition to these an adjustable micrometer ring is attached to the cross slide hand wheel, which assists in accurately traversing the cross slide and also in quickly setting stops in correct relation to each other. By turning the knob an abutment is brought into line with the stop to be used. To guard against breaking the gearing which operates the cross slide, an automatic adjustable friction driving device is introduced.

spindle the cross slide is moved under the spindle nose.

The following are the lathe's principal dimensions:

Swing over bed.....	19 in.
Swing over special forming slide.....	10 in.
Diameter of hole through spindle.....	2 1/2 in.
Largest capacity of standard collet.....	2 1/8 in.
Driving pulley.....	14 x 3 in.
Floor space without rod feed mechanism.....	9 1/2 x 4 ft.
Weight, with countershaft.....	5,200 lb.

The Turret Tools for Rods.

A variety of turret tools adapted to meet practically all requirements are furnished. The universal turner shown at the front in Fig. 6 and at A and B in Fig. 10 is used principally for turning bar work up to 2 1/2 in. in diameter, and is equally effective working toward the spindle, as is usual on short work, or away from the spindle, which is frequently desirable on long, slender work. The cutting tool is held in a slide by two set screws. The cutter is "overshot" or tangent to the work, in which position heavy cuts may be taken, owing to its rigidity, and long life is insured, as regrinding is

on the end only. The cutter is of high speed steel, may be adjusted for different diameters and for facing shoulders, and after facing a piece of work can be withdrawn from the stock to prevent marring it when the turret slide is returned. An adjustable positive stop, clamped to the slide operating screw, in conjunction with a stop bar, guides restoring the cutter to its original position for the next turning operation. The back rests are of V type, and are quickly and conveniently adjusted in relation to the cutting tool. The strap which takes the backward thrust of the jaws may be swung away to leave the back rest jaws free, which is convenient when setting up new work or when changing the cutting tool; in the latter case no readjustment to the back rest strap

from a long lever, which may be clamped to the pinion stud at any convenient angle. An adjustable stop limits the swing of the lever and thereby the extent of the slide movement. Tools may be carried on either or both ends of the slide, and rest on rockers to give correct cutting angles.

A taper turning tool, for turning tapers either on forgings or on bar stock, is shown in Figs. 8 and 9, and at F in Fig. 10. For the former the back rest jaws are set to follow the cutting tool and to move radially to suit the changing diameter being produced, while for the latter, if bright rolled stock is used, the slide holding the back rest jaws is clamped to prevent movement and the jaws are reversed, so as to precede the cutting tool.

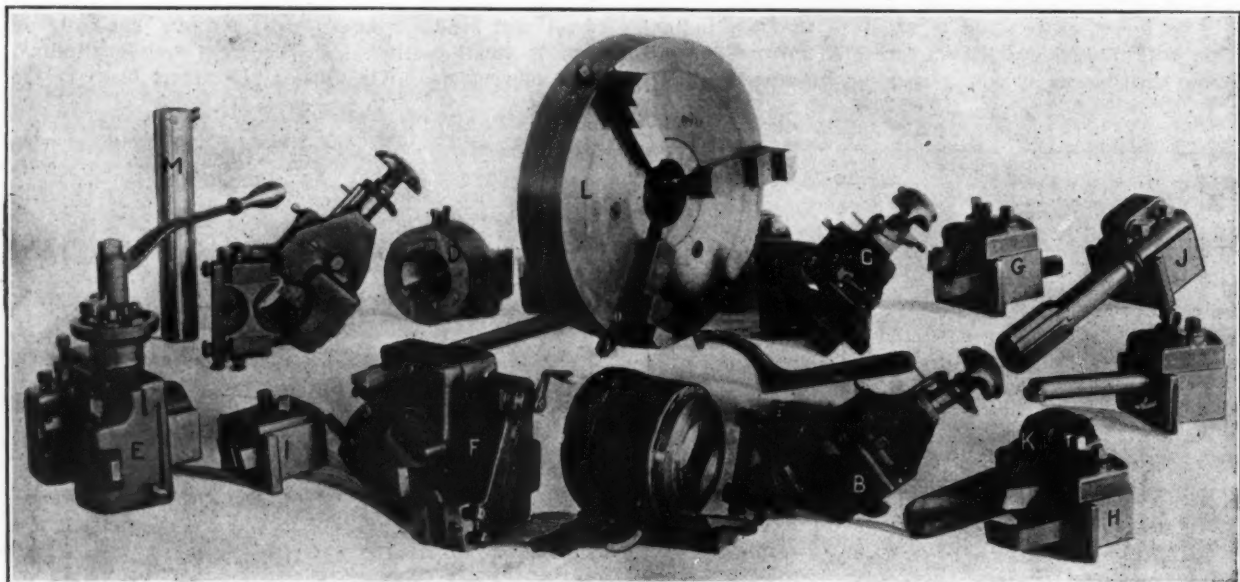


Fig. 10.—Some of the Tools and Attachments Used on the New Pratt & Whitney Turret Lathe.

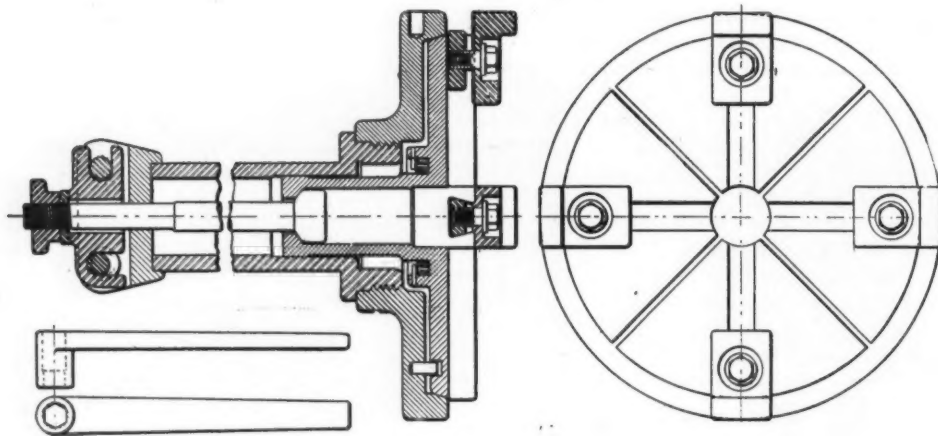


Fig. 11.—Sectional View of the Step Chuck and Closer with Adjustable Jaws.

screws is required. This tool is also furnished with roller back rests for high speed roughing out operations.

The open side turner, C in Fig. 10, is for turning short work above $2\frac{1}{2}$ in. in diameter, when back rest jaws are not necessary, and is otherwise similar to the universal turner. The bell mouth pointing tool shown at the left in Fig. 6 and at D in Fig. 10 is adapted for chamfering the end of a rough bar in advance of the turners. It has a single cutter, which is adjustable, and may be taken out for regrinding. The back rest jaws are inserted, and are of hardened tool steel.

The end forming and pointing tool, as the name indicates, is generally used for end forming and pointing bar work, and for this purpose is provided with back rests ahead of the cutting tool for supporting the work. It is not adapted for pointing rough unturned bars.

The turret cut-off and forming tool, the one in operating position in Fig. 6 and at E in Fig. 10, has a body which is clamped to the turret of the lathe, and carries a cross slide. The latter is operated by rack and pinion

Roughing and finishing cuts are taken, if desired, when the turner is used with the back rest following the cutting tool, the tool being advanced by the crank shown. To set the tool for given work a bar is prepared having a taper one-half that required on the piece to be turned. The principal parts of the tool are a body which is clamped to the turret of the lathe, a tool carrying slide, a back rest carrying slide, a taper bar and a lever which communicates movement from the tool slide to the back rest slide in proper relation to keep the V-back rest jaws in contact with the work.

The movement of the tool carrying slide is controlled by the taper bar, which, as the turret moves forward, is forced between a block, adjustably mounted on the tool carrying slide, and the body. The action of a spring and that of the cutting tool tend to move the tool slide away from the work, and incidentally hold the block in contact with the taper bar. The tool slide has an antifriction roller to take the end thrust during cutting. The back rest is mounted in a bracket rigidly fastened to the

body. A lever pivoted to the bracket carries two blocks at unequal distances from the pivot. In using the taper turner, with the back rest following, one of the blocks engages a slot in the tool bearing slide and the other block a slot in the back rest slide. The pivot being stationary, movement of the tool slide is communicated to the back rest slide, the latter traveling sufficiently faster than the tool slide to compensate for the angles of the back rest jaws. When the taper turner is to be used with the back rest stationary the lever is removed. Independent adjustment to each of the back rest jaws is afforded by the screws shown. A micrometer ring is provided on the taper bar block adjusting screw.

For threading purposes self-opening die heads are supplied, having roughing and finishing attachments. With this machine the 1½-in. capacity is recommended for general work, but 2-in. die heads can be furnished.

For centering and turning forged bolts, the heads of which may be more or less eccentric, a forging chuck and lever scroll chuck are used in combination. The latter is mounted in one of the turret slots. The forging chuck, which has two loosely fitted floating jaws on a right and left hand screw, is carried by a shank fitting the regular 2-in. chuck jaws in the spindle. The bolt is placed in the scroll chuck on the turret, its head coming where it may; the turret is advanced by hand until the bolt head comes between the jaws of the forging chuck, when the latter are closed by the right and left hand screw gripping the bolt head; the scroll chuck is next opened, the turret run back and indexed to the first turner required, and the turning proceeded with.

Fifteen sets of collet jaws are all that are required to handle all sizes of round stock, from ¼ to 2½ in., inclusive; square stock, from ¼ to 1¼ in. across the flats, and hexagon stock, from ¼ to 2-3-16 in. across the flats. Each jaw is capable of handling rods from one-sixteenth under to one-sixteenth oversize, and in these cases a parallel line contact is retained.

Tools for Castings and Forgings and Chucking Work.

The triple tool holder for boring and turning shown at the front in Fig. 7 and at G and H in Fig. 10 is very adaptable, and is convenient for boring, facing and cutting grooves. In some cases several cutting tools are used simultaneously and frequently independently. It is useful for general work, and with one boring bar in conjunction with the sliding cross turret is suitable for boring and recessing holes of widely varying diameter.

The end facing and recessing tool (I, Fig. 10) is recommended for flat facing and grooving. There are three independent clamping screws, so that three separate cutting tools may be used at one time when desired.

The facing and boring tool post holder at the right in Fig. 7 is designed to use ordinary lathe tools, and is especially suitable for facing work. It is frequently furnished with two tool posts, for simultaneously cutting with two tools. The height of the cutting tools is adjusted by the step collar shown. The offset single and double tool post holders are identical, except for the length of the tool post carrying arm, and are similar to the holder just described, but with the arm offset for turning instead of facing. The double holder is only used on long work, when it is possible to use two cutting tools. These holders are stiff, and well adapted for other purposes than outside turning. The tool bar with straps instead of tool posts is otherwise similar to the offset double tool post holder, and is recommended where the circular tool holder and step collar would interfere with the work and necessitate offset cutting tools.

Die heads and drill holders of the form shown at the left in Fig. 7 and at J and K in Fig. 10 securely hold ordinary drills and boring bars and the regularly furnished die head. There are two sizes, 2¼ and 3 in. capacity, with bushings for 1½, 2 and 2½ in. sizes.

The face plate equipment consists of a face plate fitting the head spindle, and a set of straps, clamping bolts and bunters. It is convenient for holding quite a variety of work during a first or second operation. When holding work, such as cylinders, gear blanks and pulleys, for a second operation, a locating plug, to enter a hole previously bored in the work, is generally utilized. The

clamping screws and bunters are tapped into nuts, fitting radial slots in the plate, and consequently work of varying diameters can be readily held.

A 15-in. combination three-jaw chuck (L, Fig. 10) is recommended for casting and forging work. The chuck is rendered universal or independent by the meshing or unmeshing of a circular rack with a double pinion on the screw. In holding eccentric or irregular work, the jaws may be placed in any desired position and the rack and screw pinions meshed, forming a chuck with eccentrically placed, but simultaneously moved jaws.

An extremely useful and new tool is the step chuck and closer, with adjustable jaws, shown in the sectional drawing, Fig. 11. When performing the second operation on a piece, such as a gear being finished on both sides where the first operation would be finished while the gear is held in the three jaw chuck, the step chuck is particularly useful. The closer of this chuck is made of gun iron and is screwed solid on the end of the spindle. The step chuck itself is of steel, split in four places; in each section is a bevel slot. A bevel nut conforming to the slot is drawn up against the side of the slot when tightening the jaws, which gives an extremely tight grip. After the jaws are fastened approximately the right distance from the center, a plug is inserted in the hole, of the same dimension as the hole, when the step chuck is closed by the closing mechanism at the rear of the spindle, which consists of an eccentric operated with a wrench. Next, the boring tool is brought forward from the turret and the jaws are stepped out to the desired diameter, which will be the same as the diameter of the finished end of the piece made in the three jaw chuck at the first operation. The closing mechanism is then released and the plug removed, after which the piece is inserted in the jaws and the step chuck closed. The piece will then run true on the same center it had during the first operation.

Other accessories which are furnished are as follows: Blank face plates of sufficient outside diameter to be fitted to any size jaw chuck finished to suit the end of the spindle; boring bars with adjustable cutters (M, Fig. 10), of steel, hardened and ground, in which the cutter is securely clamped by a wedge shaped pin and the adjustment obtained by a headless set screw; Morse taper drill and reamer adapters of cylindrical shape on the outside to suit the die head and reamer holders, provided with Nos. 2, 3 and 4 Morse tapers to receive drills and reamers of these dimensions; a floating reamer holder of such construction that it always holds the reamer by its own center, yet in a flexible manner, so as to allow it to adjust itself to the hole being reamed; and a releasing tap holder which is convenient in tapping holes to exact depth.

During the month of May the Allis-Chalmers Company shipped from its works 553 cars of machinery, which was a gain of 20 cars over the record established in April. In April the aggregate weight of shipments was 21,680,847 lb., while for the month of May the figure had risen to 23,772,242 lb., making a total weight for the two months of 45,453,089 lb. Cars bearing this enormous quantity of machinery, if coupled in one train, would have covered a distance of about 8 miles.

On Thursday, June 20, ground was broken near Cold Spring, N. Y., west of the Hudson River, for one of the greatest engineering projects of the times. Huge reservoirs are to be constructed in the Catskills and an aqueduct is to bring water from there to the city of New York, 100 miles distant. The work will cost at least \$160,000,000 and will add 500,000,000 gal. daily to the present Croton supply.

The Institution of Mining and Metallurgy of London has suggested and recommended the adoption of the following definitions: That the ton be a weight of 2000 lb. avoirdupois; that the miner's inch be a flow of 1.5 cu. ft. per minute; that the gallon be the gallon of 10 lb.; that all temperatures be expressed in degrees centigrade; that gold and silver returns be stated in terms of fine metal and not as bullion; that the gold contents of ore be expressed in the Troy ounce of fine gold, worth \$20.67, or 85 shillings.

The American Society for Testing Materials.

Discussion on Steel Rails at the Atlantic City Meeting, Held June 20-22.

The tenth annual meeting of the American Society for Testing Materials was held at Atlantic City, June 20, 21 and 22. Evidence of the large place the society is filling in its important field was given by the record attendance at this meeting, by the magnitude of the interests represented, and by the important contributions made in papers and discussions to the literature of materials of construction. Naturally the consideration of steel rail specifications, in the light of the discussion that has gone on for the past few months, attracted larger delegations than usual from railroads and rail manufacturers. The session devoted to the subject may have disappointed those who looked for sharp passages between producers and consumers. Railroad representatives and inspecting and consulting engineers contributed most of the discussion. The steel works engineers for the most part confined themselves to correcting statements that did not tally with their experience and to emphasizing some particulars in which railroad practice was responsible for rail troubles.

After several years of irreconcilable differences between the railroad and the steel works members of the Committee on Iron and Steel, a rail specification was finally approved for letter ballot, a fact that makes last week's meeting noteworthy.

From the standpoint of scientific progress the feature of the meeting was the paper of Allerton S. Cushman, Assistant Director, Office of Public Roads, Department of Agriculture, Washington, D. C., on "The Corrosion of Iron." It detailed experiments of great significance bearing on the theory that rusting is a product of electrolytic action, and it may pave the way for an important advance in the practical handling of the problem of corrosion.

The meeting emphasized a condition made plain in previous years—that two and a half days, with those in attendance dividing into two sections for two half days, crowds the sessions greatly and deprives many of the opportunity of hearing discussions in which they are interested. It is probable that next year four or five days will be given to the meeting and the programme so arranged that not more than one session will be held at a time, the topics being grouped so that a member may comfortably hear the proceedings of special interest to him within a period of, say, three days.

The registration of members and guests was 268, the largest in the history of the society.

THURSDAY AFTERNOON.

The president, Dr. Charles B. Dudley, Altoona, Pa., who was absent in Europe at the time of the last convention, was warmly welcomed upon taking the chair at the opening session Wednesday afternoon.

The Status of the Society.

The annual report of the Executive Committee was submitted in printed form. It showed that the membership had grown in the year from 835 to 925, not reaching the expectation that the 1000 mark would be passed by the present meeting. The last volume of Proceedings contained 712 pages, as against 565 pages in the preceding year. The receipts of the year were \$6675, and the expenditures \$6416, leaving a balance of \$259. The society ceased in 1906 calling on contributing members, but in view of outstanding obligations slightly in excess of the amount on hand, contributing members will be asked for dues for the current year. Within the year, in pursuance of last year's action, a new Committee, V, on the Corrosion of Iron and Steel, was organized. The Executive Committee decided to abandon the attempt to organize a Committee on Standard Specifications and Tests for Wire Rope and to postpone indefinitely the organization of a Committee on Chain Iron and Steel, Chains and Chain Cables.

The effort to extend the society's membership is being pushed forward, and the secretary, Prof. Edgar Marburg, University of Pennsylvania, Philadelphia, Pa., will be glad to receive applications from firms and individuals interested in the work the society is prosecuting.

The Buying of Raw Materials.

The first paper Thursday afternoon, on "The Raw Material Supply," prepared by P. H. Knight and C. E. Skinner of the Westinghouse Electric & Mfg. Company, East Pittsburgh, Pa., was read by Mr. Skinner. The writers discussed a number of points connected with the purchase of materials for a large manufacturing company, such as the one with which they are connected. One surprising statement was that this company's list contains no less than 850 items representing distinct classes or grades of material. The term raw material was used in the paper to cover all material purchased, on which work has to be done by the manufacturing company, or which is consumed in the manufacturing process, as cutting compounds, fuel, oils, coke, &c. Questions relating to specifications, purchases by brands, variations in quality, &c., were discussed, with other engineering and commercial phases of the relations between producer and consumer.

Government Coal Specifications.

An interesting feature of this session was the presentation of data concerning the purchase by the United States Government of coal under specifications. J. E. Woodwell, who has carried on the work of introducing and developing specifications for the purchase of coal for various buildings throughout the country under the jurisdiction of the Treasury Department, read a paper giving the results of the work. Experience with a specification which penalizes a deficiency in heating value only has developed an average deficiency of about 3.5 per cent., which on contracts aggregating \$200,000 has meant a saving of \$7000, of which not more than \$1000 can be charged to testing. Individual deliveries have shown as high as 47 per cent. of ash, where the contract standard was about 6 per cent., while the heating value was only about half that stipulated.

Mr. Woodwell was followed by Dwight T. Randall, who appeared in the stead of Prof. J. A. Holmes. Mr. Randall is in charge of the smoke investigations of the United States Geological Survey. As indicating the importance of getting coal up to the quality paid for, Mr. Randall said that the United States Government coal bill was \$6,500,000 per annum. In the past year the Bureau for the Testing of Fuels has visited 159 coal mines in 23 States and thus has obtained a good idea of the characteristics of various coals. The necessity for specifications appears in the fact that run of mine coal contains about 30 per cent. more ash, as shown by actual deliveries, than was contained in the mine sample. The necessity of careful sampling is shown by the fact that in car samples 8 per cent. more ash is found in coal taken from the top than in coal from the bottom. Mr. Randall stated the Fuel Department of the Geological Survey will conduct experiments at Norfolk, Va., to determine the extent to which the combustion of bituminous coal can be made smokeless.

S. S. Voorhees, Washington, D. C., gave details of the methods of testing coal carried out by the Government. The printed specifications as now enforced by the Treasury Department were distributed among the members. It was stated that regular tests had been made in the past year of coal delivered to 24 Government Buildings, under these specifications. They provide the percentages of ash, volatile matter and sulphur which may not be exceeded, as well as the limit on dust and fine coal, and the required number of British thermal units is specified.

H. M. Wilson, who is associated with Prof. J. A.

Holmes in the fuel testing work, said that the St. Louis plant, excepting the coking plant, had been moved to Norfolk, Va., to test the various coals reaching that port for naval vessels. The coking plant goes from St. Louis to Denver, where it will be used in making tests of coals from Government coal lands. The work which will be carried on at Norfolk during the Jamestown Exposition will include tests of peats from Maine, the Dismal Swamp and Florida, also tests on lignites, machinery being provided for briquetting the latter. Another important feature will be tests of denatured alcohol, which will be used in engines in comparison with gas and gasoline.

Discussion.

In the discussion on this subject the chairman referred to the Government specification for coal as the best in that line he had seen. Mr. Woodwell said it had been noticed that the anthracite coal producers are less willing than the bituminous producers to deliver coal under specifications. In the coming year about 30 Government buildings will receive coal under the specifications which have been prepared. Naturally these will have to be adjusted to localities: From some districts the coal would run 5 per cent. in sulphur, while in other districts the specification peg could be set at 1 per cent. Producers of high grade coal are beginning to appreciate the fact that they are benefited by specifications. The object of the specifications adopted by the Government is not to cause rejections of coal, except for repeated failure to come up to the standard; the point is rather that the consumer simply pays what the coal is worth to him, making deductions where the standard is not reached and allowing premiums where the number of British thermal units called for is exceeded. It was observed by R. W. Lesley that the coal producers are now going through what the cement manufacturers experienced a few years ago, when many of the latter were unwilling to bid to specifications. To-day the entire cement output is sold under specifications.

Specifications for Coke.

In the absence of C. H. Zehnder, chairman of Committee J, on Standard Specifications for Coke, Dr. Richard Moldenke made a progress report. The committee has corresponded in the past year with coke consumers and manufacturers regarding their methods of sampling and analysis. Many replies have been received, from which the committee expects to compile data to be submitted to the members later.

Failures of Cast Iron in Service.

Robert Job, of Booth, Garrett & Blair, Philadelphia, read a paper on "Causes of Failure of Cast Iron in Service," from which we make some extracts:

Many service failures in the writer's experience have been caused directly by neglect to obtain a uniform composition of cast iron suited to the service. In cases in which locomotive cylinders and wheel centers failed within a short time, it was found that the phosphorus averaged nearly 1 per cent., while the silicon was over 2½ per cent. The iron was so weak that little tenacity under impact could have been expected, although the price paid was considerably higher than the market rate for quality far better adapted to the service. A careful study was made to determine both the composition and physical condition and structure which gave the best service under different classes of requirements, and to determine the means necessary to secure this quality in the output.

In many cases of failure it was found that the difficulty was due wholly or in large part to the presence of blowholes or to porosity or sponginess of the iron, and at times to the presence of considerable proportions of oxide of iron and cinder in the iron.

In the daily routine of our foundry general locomotive castings were made ranging all the way in size from locomotive cylinders and wheel centers to small castings about ¼ in. thick, and most of the castings required machining in some part. Some doubt was felt whether a single grade of pig iron would meet the requirements. At the outset, however, we drew up specifications for a strong medium iron and upon receipt of each shipment sampled and tested each carload before acceptance. The same practice was also adopted with reference to our coke supply, and the proportions of ash and of sulphur were held down to reasonable amounts. At the same time methods of treatment of the iron in the ladle and in the cupola were introduced to decrease hardness and to remove oxide of iron and blowholes, and to increase the fluidity and density of the iron.

As a result of these changes excellent results were obtained from the very start. The single grade of iron, with the careful control of the quality, gave a degree of uniformity which had

never before been possible, and by means of systematic treatment the properties of the iron could be varied as far as was desirable for the different purposes. In the machine shops the change had an immediate effect, for hard castings, "porous iron" and blowholes almost entirely disappeared. Within a few months breakages in service had fallen off to a very marked extent owing to the toughening of the iron, and at the end of a year the scrap coming in was insufficient for the needs of the foundry. In order the better to keep track of the service we stamped each wheel center as it was cast with the date, and after a lapse of three years not a single one had broken in service—a marked contrast to former conditions.

Dr. Moldenke was glad to see that the question of oxidation is getting more attention. Now that so much steel scrap is being melted in iron foundries the element manganese assumes more importance in this connection. At one time the speaker had held the idea that since manganese burned out there was little reason for using it. But to-day, with so much low carbon material employed, the steel scrap often running up to 40 per cent. of a mixture, manganese becomes a valuable element in eliminating oxides and preventing blowholes.

The remaining items of the afternoon programme were the report of Committee Q on Standard Specifications for the Grading of Structural Timber presented by Hermann von Schrenk, chairman, and a paper on "The Effect of Moisture on the Strength and Stiffness of Wood," by H. D. Tlemann.

The result of the ballot for members of the Executive Committee for the next two years was announced at the close of the session. W. A. Bostwick and W. R. Webster were chosen, each receiving 154 votes.

THURSDAY EVENING.

The presidential addresses of Dr. Dudley have always been able and practical, and that of this year, given at the Thursday evening session, was received with warm approval. It presented with eminent fairness and perspicuity the issues arising out of the enforcement of specifications and so ably and thoroughly covers the ground as fairly to make it one of the classics of testing literature. It is given in full elsewhere in this issue.

Interesting contributions to the records of concrete testing were made at this session in the following papers, which were illustrated by lantern slides: "Tests of Concrete Columns," A. N. Talbot, University of Illinois, Urbana, Ill.; "Additional Notes on Tests of Concrete Columns," by James E. Howard, Watertown Arsenal, Watertown, Mass., and "Testing of Wooden and Reinforced Telegraph Poles," by R. A. Cummings, consulting engineer, Pittsburgh, Pa. The paper of W. H. Walker and Colby Dill on "The Influence of Stress Upon the Corrosion of Iron" was read by title.

Electrolysis the Cause of Iron Rust.

The paper of Allerton S. Cushman, Washington, D. C., on "The Corrosion of Iron," was one of the most noteworthy in the annals of the society. Accompanied by lantern slide views of the exhaustive experiments Mr. Cushman has conducted and made effective by the actual projection on the screen of brilliant chemical phenomena supporting the theory that rust is a product of electrolytic action, the paper made an unusual impression. We present a synopsis of the argument:

The three theories which have been held to account for the rusting and corrosion of iron and steel are the carbonic acid, the hydrogen peroxide and the electrochemical or electrolytic theories. The first two theories, which have from time to time been vigorously defended by various investigators, have not been found adequate or borne out by critical investigation. Moody, in England, is the chief modern defender of the carbonic acid theory, but he has committed the error of propounding the theory and then forcing his experiments and observations to agree with it.

Solutions of chromic acid and its salts, such as the chromates and bichromates of potash and soda, have been found to exercise an inhibitive action on the rusting of iron and steel. This inhibitive action is all the more striking from the fact that the chromates are strong oxidizing agents. A solution of potassium bichromate no stronger than one-six-hundredth normal will indefinitely prevent the rusting of polished specimens of metal in cold water, even if free access of air and carbonic acid is provided for. Under the same conditions at a boiling

temperature no rusting or pitting takes place if the concentration of the bichromate is above two-one-hundredths normal.

BICHROMATE SOLUTIONS OPPOSE ELECTROLYSIS.

If iron in any of its forms is immersed in strong solutions of bichromate for a few hours the surface becomes passive, even after it is removed from the solution, washed and wiped. The tendency to rust is inhibited as well as the electrolytic exchange with copper, if the metal is dipped for a short time in 1 per cent. copper sulphate solution. This passive condition lasts for some time under ordinary conditions, and steel wire nails that have been chromated may be kept under water for much longer periods without rusting than untreated nails.

The passive condition gradually disappears and can be removed by heating, scouring, or by placing the metal in a vacuum. The explanation appears to be entirely electro-chemical. No film of oxide is formed, but the metal appears to have acquired an oxygen film and is thus polarized in the sense of becoming an oxygen electrode. Iron does not rust in perfectly pure hydrogen peroxide, in which solution oxygen can be made to boil off the surface of polished specimens of iron without producing any speck of rust, even after prolonged periods. Iron rusts in distilled water if oxygen is present, because the iron is attacked by the hydrogen ions supplied by the normal dissociation of water. Iron passes into solution as ferrous hydroxide, which is immediately oxidized to the insoluble red hydroxide and appears as rust.

Acids, acid salts and substances which hydrolyze in solution with an acid reaction stimulate rusting by increasing the concentration of the hydrogen ions. On the other hand, alkalis inhibit rusting in sufficient concentration, by preventing the existence of hydrogen ions.

THE ROLE OF OXYGEN SECONDARY.

The rusting of iron is therefore not due to the direct attack of oxygen combined with water. The role of the oxygen is a secondary one and the underlying cause of rusting and corrosion is an electro-chemical or electrolytic problem. Interpreted from this point of view, the rusting of iron invariably proceeds as follows: Iron passes into solution as a ferrous ion by replacing hydrogen which is set free; oxygen then oxidizes the ferrous iron to the ferric condition with the formation of a hydrated oxide. All soluble inhibitors, such as alkaline solutions or chromic acid and its salts, act either by preventing the presence of hydrogen ions or by electro-chemically preventing their attack.

The rusting of iron being essentially an electro-chemical process, is invariably accompanied by electrolytic effects. Differences of potential are established on the surface of the metal, owing to imperfect distribution of metallic impurities, and for other reasons. Positive and negative points, nodes and areas are thus formed, leading to local action and pitting. This electrolytic action can be demonstrated as a universal accompaniment of the rusting of iron. Agaragar and gelatin jellies impregnated with phenol phthalein and potassium ferricyanide invariably show red and blue nodes on specimens of iron and steel imbedded in them. The speaker showed on the screen these alternating red and blue nodes on a wire nail on which rusting was in progress. This combined indicator has been called "ferroxyl." The blue nodes are the positive poles where iron is going into solution; the negative zones are shown in red. No rusting takes place in the red areas except when a change or reversal of the poles takes place. Pitting is simply a case of persistent positive poles, whereas superficial rusting of a surface is due to frequent changes of potential, with reversals of the positive and negative polar areas. The formation of craters and cones of ferric oxide on the surface of rusting metal was demonstrated by lantern views and explained by the speaker.

As a result of laboratory experiments in demonstration of the electro-chemical theory of rusting, as originally propounded by W. R. Whitney, Mr. Cushman urged that bichromate prevention of iron rust be tried on a practical and useful scale. The paradox is presented by the experiments thus far performed of the prevention of oxidization by one of our strongest oxidizing agents,

These experiments show that the active cause of rust is not oxygen but hydrogen; and the action is not oxidation but hydroxidation. What should be aimed at is the inhibition of electrolysis by cutting down the impurities in iron and steel or the unequal distribution of these impurities, as in segregation.

FRIDAY MORNING.

Two sections were in session Friday morning, one dealing with cement and the other with preservative coatings. The report of Committee E, on Preservative Coatings for Iron and Steel, was presented at the opening of the latter session by the chairman, S. S. Voorhees. The series of paint tests planned last year and described in the report of the committee at the last convention has been started. Nineteen different paints have been applied to 600 ft. of the double track deck bridge erected by the Pennsylvania Railroad over the Susquehanna River at Havre de Grace, Md. These paints were manufactured by 16 different firms, and include nearly all the leading types—red lead, carbon as graphites, lamp black and carbon black, oxide of iron, with varying amounts and classes of inert materials, zinc oxide, asphaltums and special pigments. The vehicle is linseed oil in the majority of cases. Subscriptions amounting to \$3895 have been made by paint manufacturers to cover the expenses of the tests. The Technological Branch of the United States Geological Survey and the Bureau of Standards at Washington have expressed a desire to cooperate with the committee in the work.

W. H. Walker presented some further data on the corrosion of iron and steel, based on the theory elaborated by Mr. Cushman at the Thursday evening session that corrosion is an electro-chemical phenomenon. In the discussion that followed, Mr. Cushman, as chairman of the Committee on Corrosion of Iron and Steel, said that several methods of testing had already been developed by which it is possible to get information, in advance of use, of the resistance of iron and steel products to corrosion.

Preservative Coatings.

F. P. Cheesman, New York, presented a paper on "Linseed Oil and Paint as Priming Coats for Metal Surfaces." He said that the use of boiled linseed oil, which was general previous to 1885, was now infrequent, though some engineers still invite corrosion by its use. Authorities were cited in opposition to the use of an oil coat for priming and troubles due to its use were enumerated. It is safe to use a selected high grade natural ore iron oxide paint, while in many localities a blue lead paint would be best, in others a combination of red lead and graphite, or a carbon black paint.

A paper on "Deleterious Ingredients in Paints" was presented by L. S. Hughes. The general point was made that the wear of a paint depends upon the fineness and chemical stability of its predominant pigment. G. W. Thompson, in the discussion of the paper, suggested that the Committee on Preservative Coatings find out which pigments act electrolytically, whether there are pigments which act as chromic acid or nitric acid in rendering the surface of iron and steel inert and thus preventing electrolytic action. Mr. Cushman called attention to the differences in the rust resisting properties of the sheet or plate on which the paint is put. All paints let water through to some extent, and it is important to know the character of the plates in determining their resistance to corrosion.

The other papers of the morning were on "The Physical Properties of Paint Films," by R. S. Perry, and "Paint Legislation," by Prof. E. F. Ladd. The latter referred to the work done in North Dakota in legislating against paint frauds and to the tests now being carried on there under State auspices to determine the wearing qualities of different paints. Since 70,000,000 gal. of ready mixed paints are manufactured each year in the United States, the speaker believed there should be national legislation to protect the public against fraud.

FRIDAY AFTERNOON.

The session of Friday afternoon—the red letter occasion of the meeting in view of the widely heralded dis-

cussion on steel rails—was held on the steel pier. The attendance was unusually large.

As introductory to the discussion Secretary Marburg read the report of Committee A on Standard Specifications for Steel Rails. The specifications for steel rails presented at last year's meeting had been referred back to the committee, with instructions to report specifications giving promise of correcting, as far as possible, the defective quality of rails obtained under existing specifications. The Executive Committee, in accordance with this resolution, appointed a sub-committee of Committee A, consisting of W. A. Bostwick, P. E. Carhart, Charles B. Dudley, E. F. Kenney, Edgar Marburg, George E. Thackray and W. R. Webster. This sub-committee after two meetings unanimously agreed to reaffirm the original recommendations with two modifications. These relate to discard and straightening, consisting of paragraph *d*, section 1, and the second paragraph in section 11 of the specification, which is given in full below:

Proposed Standard Specifications for Steel Rails.

1. (a) The entire process of manufacture and testing shall be in accordance with the best current practice, and special care shall be taken to conform to the following instructions:

(b) Ingots shall be kept in a vertical position in the pit heating furnaces until ready to be rolled or until the metal in the interior has time to solidify.

(c) No bled ingots shall be used.

(d) There shall be sheared from the end of the blooms formed from the top of the ingots not less than —%, and if from any cause the steel does not then appear to be solid the shearing shall continue until it does.

CHEMICAL COMPOSITION.

2. Rails of the various weights per yard specified below shall conform to the following limits in chemical composition:

	50 to 59 lb.	60 to 69 lb.	70 to 79 lb.	80 to 89 lb.	90 to 100 lb.
Carbon	0.35-0.45	0.38-0.48	0.40-0.50	0.43-0.53	0.45-0.55
Phosphorus shall not exceed....	0.10	0.10	0.10	0.10	0.10
Silicon shall not exceed	0.20	0.20	0.20	0.20	0.20
Manganese	0.70-1.00	0.70-1.00	0.75-1.05	0.80-1.10	0.80-1.10

DROP TEST.

3. One drop test shall be made on a piece of rail not less than 4 ft. and not more than 6 ft. long, selected from every fifth blow of steel. The test shall be taken from the top of the ingot. The rail shall be placed head upward on the supports, and the various sections shall be subjected to the following impact tests under a free falling weight:

	Weight of rail. Pounds per yard.	Height of drop. Feet.
More than.....	45 to and including 55	15
More than.....	55 to and including 65	16
More than.....	65 to and including 75	17
More than.....	75 to and including 85	18
More than.....	85 to and including 100	19

If any rail break when subject to the drop test, two additional tests, taken from the top of the ingot, will be made of other rails from the same blow of steel, and if either of these latter tests fail, all the rails of the blow which they represent will be rejected, but if both of these additional test pieces meet the requirements all the rails of the blow which they represent will be accepted.

FINISHING TEMPERATURE.

4. The number of passes and speed of train shall be so regulated that on leaving the rolls at the final pass the temperature of the rail will not exceed that which requires a shrinkage allowance at the hot saws, for a 30-ft. rail of 100-lb. section, of 6 11-16 in., and 1-16 in. less for each 5 lb. decrease of section. These allowances to be decreased at the rate of 0.01 in. for each second of time elapsed between the rail leaving the finishing rolls and being sawed. No artificial means of cooling the rails shall be used between the finishing pass and the hot saws.

DROP TESTING MACHINE.

5. The drop testing machine shall have a tup of 2000 lb. weight, the striking face of which shall have a radius of not more than 5 in., and the test rail shall be placed head upward on solid supports 3 ft. apart. The anvil block shall weigh at least 20,000 lb., and the supports shall be part of, or firmly secured to, the anvil. The report of the drop test shall state the atmospheric temperature at the time the test was made.

ANALYSES.

6. The manufacturer shall furnish the inspector daily with carbon determinations for each blow, and a complete chemical analysis every 24 hours, representing the average of the other elements contained in the steel, for each day and night turn. These analyses shall be made on drillings taken from a small test ingot.

* The percentage of minimum discard in any case to be subject to agreement, and it should be recognized that the higher this percentage the greater will be the cost.

SECTION.

7. Unless otherwise specified, the section of rail shall be the American Standard, recommended by the American Society of Civil Engineers, and shall conform, as accurately as possible, to the templet furnished by the railroad company, consistent with paragraph No. 8, relative to specified weight. A variation in height of 1-64 in. less, or 1-32 in. greater than the specified height, and 1-16 in. in width will be permitted.

8. The weight of the rails will be maintained as nearly as possible, after complying with paragraph No. 7, to that specified in contract. A variation of one-half (½) of 1 per cent. for an entire order will be allowed. Rails shall be accepted and paid for according to actual weights.

LENGTH.

9. The standard length of rails shall be 30 ft. Ten per cent. of the entire order will be accepted in shorter lengths, varying by even feet to 24 ft., and all No. 1 rails less than 30 ft. shall be painted green on the end. A variation of ¼ in. in length from that specified will be allowed.

10. Circular holes for splice bars shall be drilled in accordance with the specifications of the purchaser. The holes shall accurately conform to the drawing and dimensions furnished in every respect, and must be free from burrs.

STRAIGHTENING.

11. Care must be taken in hot-straightening the rails, and it must result in their being left in such a condition that they shall not vary throughout their entire length more than 5 in. from a straight line in any direction, when delivered to the cold-straightening presses. Those which vary beyond that amount, or have short kinks, shall be classed as second-quality rails and be so stamped.

The distance between supports of rails in the gagging press shall be not less than 42 in.

Rails shall be straight in line and surface when finished—the straightening being done while cold—smooth on head, sawed square at ends, variation to be not more than 1-32 in., and prior to shipment shall have the burr occasioned by the saw cutting removed and the ends made clean. No. 1 rails shall be free from injurious defects and flaws of all kinds.

BRANDING.

12. The name of the maker, the weight of rail and the month and year of manufacture shall be rolled in raised letter on the side of the web, and the number of blow shall be plainly stamped on each rail where it will not subsequently be covered by the splice bars.

INSPECTION.

13. The inspector representing the purchaser shall have free entry to the works of the manufacturer at all times when the contract is being filled, and shall have all reasonable facilities afforded him by the manufacturer to satisfy him that the finished material is furnished in accordance with the terms of these specifications. All tests and inspections shall be made at the place of manufacture prior to shipment.

NO. 2 RAILS.

14. No. 2 rails will be accepted up to 10 per cent. of the whole order. Rails that possess any injurious defects, or which for any other cause are not suitable for first quality, or No. 1 rails, shall be considered as No. 2 rails; provided, however, that rails which contain any physical defects which impair their strength shall be rejected. The ends of all No. 2 rails shall be painted white in order to distinguish them.

An Independent Expert's Opinion.

Wm. R. Webster, in his capacity as consulting engineer, holds the position of arbiter between producer and consumer. In opening the discussion he said:

The different opinions expressed by the representatives of the railroad companies and the rail manufacturers in the current discussion as to what would constitute a satisfactory rail call to my mind the remarks of Sir Lowthian Bell during the discussion on "Recent Practice in Rails," at the annual convention of the American Society of Civil Engineers in London, June, 1900. The report says:

As he had been 25 years a manufacturer of rails, and 25 years a director in the Northeastern Railway, he represented both maker and user, and he had at his disposal 35,000 analyses to go upon in making deductions. From these he could prove and disprove everything that could be said for or against any composition of a rail—a facility beloved by the expert.

Notwithstanding all this, if the important factors that have a direct bearing on the quality of the finished rail are considered, most of the conflicting opinions can be harmonized. The committees at work on the problems are doing this. They are endeavoring to secure good uniform methods of manufacture by specifying chemical composition, amount of discard from top of ingot, finishing temperature in rolling, limit of camber in rails coming to the gag press for cold straightening, and drop tests. They are nearer together now on these requirements than ever before, and it is to be hoped that by interchange of views a specification will soon be arrived at which will be acceptable to all.

WHY NEW SECTIONS ARE NEEDED.

It must be admitted that the best rails are produced from steel low in phosphorus, rolled with light reductions and finished at proper low temperature. But the sections now

in use make it almost impossible to continue the work of rolling on the head to a low enough temperature to produce the fine grained structure desired. Therefore a good starting point for this discussion would be section.

In a recent discussion it was claimed that the old committee of the American Society of Civil Engineers kept in mind the importance of low finishing temperature in designing their rails, and gave sections best suited for that purpose. As a matter of fact, the effect of the heat treatment of steel was not properly appreciated at the time the committee made its report in 1892 and the sections do not permit of a low enough finishing temperature in rolling owing to the wide thin flanges. This, to a large extent, has caused the great trouble with 100-lb. rails rolled to these sections. Other 100-lb. sections gave trouble, and on March 25, 1901, I wrote in part to the American Society of Civil Engineers asking for a new Rail Committee:

I would respectfully ask that a committee be appointed to investigate and report on standard rail sections. The reasons for asking for this committee are that rails of 80 lb. and over are not giving good service. This is true of all heavy rails, whether rolled to American Society of Civil Engineers' sections or others. The cause of the trouble is now well known, it being due to the large mass of metal in the head carrying the heat so much longer than the thin metal in the flanges, thus preventing the work of rolling on the head at sufficiently low temperature to break up the coarse grain and produce the tough, good-wearing rails desired.

The Board of Directors brought this up for discussion at the annual meeting in June and the committee was appointed in 1902. It is still struggling with the problem. In the arguments against the appointment of such a committee it was claimed that sufficient evidence had not been produced to show that the heavier rail sections were not giving as good results as the lighter. Those present to-day must admit that the results of the past five years have given conclusive evidence that a change in section is advisable.

It has been the invariable experience in changing from a light to a heavy section, in any class of rolled steel, that difficulties have been met and modifications have been made in the methods of rolling, in order to get as good a structure in the heavier section as was formerly obtained in the lighter sections. In ordinary sections other than rails it was a comparatively easy matter to overcome the trouble and get a good structure; but the thin flange of the rail and the higher carbons called for in the heavier sections further complicate matters.

RAILS OF 120 AND 125 LB. WANTED.

If a rail with the same width of head as the present American Society of Civil Engineers' 100-lb. rail is required, the head will have to be made thicker and the radius under the head larger, in order to prevent the sides of the head from shearing or breaking off as at present, and more metal put in the web and flange in order to carry the heat, and thus allow the head to be finished at the proper low temperature. This would mean a rail of 120 to 125 lb. per yard. I believe we are coming to heavier rails before we get rid of our present troubles.

In all justice it must be admitted that a fair percentage of breakage is caused by the great increase of wheel loads since 1892, increase in speed of trains, use of large capacity steel cars; also that we do find poor track, poor rail joints, driving wheels not properly counterbalanced, flat wheels, &c. These conditions will no doubt be improved, but they must be considered in deciding on the rail for the future.

THE OPEN HEARTH RAIL.

Open hearth steel rails of the present weight and section rolled under the present conditions of manufacture cannot be relied on to overcome all troubles. Most of the basic open hearth steel manufactured in this country is much lower in carbon than that required for rail steel, and it is therefore much easier to control the uniformity of such steel. The common practice of Bessemer steel rail mills is to allow 10 points leeway in carbon, and some of the basic open hearth mills claim to work within these limits, but even as high as 18 points leeway has been asked. It is easier to work within narrow limits of carbon in the acid open hearth steel process than in the basic.

What is wanted is a steel as nearly uniform in carbon and other chemical elements as possible, without inflicting too great hardship on the manufacturer. We desire full expression of opinion from the basic open hearth steel manufacturers as to just what chemical requirements and limits they would agree to work to in rail steel.

It would be a very simple matter to roll for demonstration 1000 tons of extra heavy rails of basic open hearth steel and 1000 tons of the same section of Bessemer steel, with enough metal in the web and flange to finish them in rolling at the lowest possible temperature without injuring the metal in the flange. In other words, approach as nearly as possible, the rolling conditions of the old bull head rail, which has been rolled with only $4\frac{1}{2}$ in. shrinkage allowance in a 30-ft. rail. Let the chemical composition, per cent. of discard and conditions of manufacture be in accordance with best modern

practice. The expense of preparing rolls and rolling such rails would be trifling in comparison with the information obtained, and the rails would be better than any heavy rails ever rolled.

Secretary Marburg next read a paper by Benjamin Talbot, Middlesbrough, England, which appears elsewhere in this issue.

Defects Started by the Gaggling Press.

Secretary Marburg read the following communication from Morgan T. Jones of the American Bureau of Inspection and Tests, Chicago:

The main point I want to raise is in connection with the use of the gag in the straightening of rails. I am convinced beyond a doubt that the majority of broken rails can be directly traced to fractures caused by the gag. In looking over the reports from various sources during the recent agitation I fail to find in any one of them that the responsibility has been placed in this direction. I feel perfectly safe in saying that if this matter is properly investigated my assertion will be found to be true. In support of it I offer the following:

Take the rail that is submitted for drop tests. This test piece is cut from the front end of the first rail rolled and comes from the top of the ingot. After being allowed to cool off naturally we find in almost every instance it will resist the enormous shock it receives under the prescribed test. Then, again, take a test piece from the same rail after it has received several blows from the gag in straightening and subject this piece to the same test, placing it in position so that the drop will fall directly upon a point at which it has been gagged, and I will venture to say it will not show the same results. I firmly believe that this is the all important point to be taken up with a view to finding a remedy.

Would it not be practicable to straighten a rail by running it into fixed casings covering the flange and web the entire length, allowing enough space around the parts encased to take up the contraction and prevent it from warping out of line and surface? If the railroad companies decide to remodel their sections, allowing more metal in the base or flange of the rail, I believe the contraction would be so moderate that this could be accomplished. The rails could be forced into these casings through a set of dummy rolls placed in position at the point of entry to the casing. While to inaugurate this system would appear to be costly to the manufacturers, they should not lose sight of the fact that in the long run it would be a great saving to them. Besides getting the desired results it would do away with straighteners, gaggers, straightening machines and cost of maintaining them, and the space now taken up in the finishing department by these machines could be utilized for cooling beds, avoiding the necessity of making much change.

Another question is that of inspection, and the manner in which it is conducted to-day by railroad representatives. In forming specifications I would suggest a clause compelling the mills to do their loading in reasonable hours, say, between 6 a.m. and 6 p.m. As it now stands, some of the mills commence loading shortly after daylight and continue to sundown, which necessitates doubling the force of inspection, if all the rails are to be inspected. I am of the opinion that an inspection is practically worthless, if only a part of the rails are inspected, as it is in the uninspected lots that defective rails are liable to get away. In many instances the railroads appoint representatives without knowing their qualifications to fill the position. Owing to inexperience some inspectors are more or less afraid to offer protest when rails do not conform to specifications, and they pay very little attention to the quality of the rails, as they seldom make any effort to walk over them. It would be well for the railroads to look into this, as it would materially help to better the results.

P. H. Dudley, New York, presented an elaborate paper on "Mechanical Experiences with Limber and Stiff Rail Sections," which was accompanied by illustrations. Fuller reference to this paper will be made later.

Sulphur Content and Carbon Segregation.

Prof. Henry M. Howe, New York, was on the programme for a paper entitled "Segregation in Steel Ingots." In lieu of the paper, which will be printed in full in the proceedings of the society, Professor Howe had sent a summary of an important section of the paper, in which he answered in the negative the question, "Does low sulphur content lessen the segregation of carbon?" The summary was presented in connection with the steel rail discussion and is as follows:

If low sulphur content lessened the segregation of carbon this fact would increase the value of the thorough desulphurizing which certain electrical processes, such as the Heroult, bring about. We often think of segregation only as concentrating the sulphur and phosphorus harmfully in

the upper part of the axis of the ingot; indeed, in case of low carbon steel this is its chief reproach. But in case of high carbon steel, segregation does the further harm of giving great irregularity of carbon content. If these electrical refining processes not only expel sulphur thoroughly, but thereby prevent or lessen the segregation of carbon, this is so much to their good.

In order to answer this question, the author has examined all the available cases of segregation, about 100 in number, and has given his results in a table and diagram which accompany the paper. Briefly, the evidence answers "No" to our question. In other words, it raises a very strong presumption against the belief that low sulphur content tends to restrain the segregation of carbon.

Comments by Captain Hunt.

Capt. Robert W. Hunt, Chicago, who was called upon to open the general discussion on rail specifications, believed that a point had now been reached where a radical departure should be made in the section of the rail. When the original American Society of Civil Engineers sections were promulgated in 1892, those above 80 lb. were a matter of compromise, and it is not surprising that changes should now be needed. Whatever the section the rail will not be satisfactory unless the manufacturer makes it carefully and puts good steel into it. Time is a great factor in the manipulations in the mill. He questioned if enough time was allowed to elapse after the carbon additions before the teeming of the ingot. He recalled an experience at the Troy Steel Works in the old days when the staves from Standard Oil Company barrels which had been sent out of this country and which foreigners had returned, filling them with ferromanganese, were made use of with good effect. These oil saturated staves were cut up and thrust into the metal in the ladle, giving high heat and insuring solid ingots.

As much pains should be taken in making a rail that will not kill people as used to be taken with the steel designed for killing people—that entering into gun barrels. One thing the steel manufacturers must now face and that is the building of more mills under the new specifications in order to get out the same tonnage as is now being rolled.

Anybody going into a modern steel mill and watching the ingots rolled will see that large cracks are often formed across the face of the ingot in the first passes. These are elongated in subsequent passes and apparently disappear, but many failures can be traced back to these very cracks. At least two concerns propose now to roll the ingot diagonally before it goes to the blooming mill proper, but unfortunately these two mills intend to start with larger ingots.

Referring to the provision in section 3 that the drop test should be made on a piece of rail selected from every fifth blow, he contended that if it is important to have a drop test at all it should be on steel taken from every blow. The one objection offered to it is that it will cut down the product of the works, because it will take more time. Passing to Section 4 the speaker believed that a more definite statement should be made as to finishing temperatures and the number of passes. With a large number of passes and slow reductions there will be different results from those secured with few reductions, and the application of great force; since heavy reductions tear the metal. In the conferences soon to take place between the manufacturers and the railroads the speaker believed that some agreement would be reached as to a definite number of passes, and that this would be a feature of the future specifications.

Section 6 of the proposed specification calls for carbon determinations for each blow. Captain Hunt thought it as necessary to know the phosphorus in every heat as to know the carbon. The speaker approved the addition made by the committee to its original provision relative to straightening in providing that the distance between supports of rails in the gagging press should not be less than 42 in. He had frequently seen rails struck blows on one end enough to make the other end jump through an arc of 18 in. It is not surprising that such rails break in service. Just now a common form of break is one of crescent shape coming out at the flange. This goes back to the rolling mill, being a result of the violence of the gagging operation.

The camber of 5 in. allowed after hot straightening he considered a moderate one. The specifications of the Railway Maintenance of Way Association make it 3 in. More care must be taken in hot straightening than has been the custom heretofore. On section 14 the idea of the speaker was that the characterization of the No. 2 rail should be made more definite. As to the claim that \$28 is not enough for such rails as some of the railroads are now asking, let the manufacturers say what will be enough, and then it will be for the railroads to say whether they will pay it.

Wheel Loads and Rail Strength.

H. V. Wille of the Baldwin Locomotive Works, Philadelphia, presented a series of diagrams plotting the increases in driving wheel loads in recent years, as made up from the records of his company.

W. C. Cushing, chief engineer of maintenance of way on the Pennsylvania Company's southwest system, remarked that the rail strength has increased in greater proportion than the weights of rolling stock. The extreme stress on a 100-lb. rail to-day is only about 8800 lb. per square inch, which is very small for the character of the steel.

President Dudley presented some figures gathered by railroad officials and forming part of a confidential document, tending to show that the theoretical service capacity of rails as represented in size of section and physical properties had increased faster than the actual load of engines. Based on engine load the 85-lb. rail is all that is needed.

Watertown Arsenal Tests.

The statement was made by James E. Howard of the Watertown Arsenal, Watertown, Mass., that in the coming year considerable attention would be devoted to the investigation there of iron and steel, beginning with the ingot structure and following the process of steel manufacture in the different stages. He had opportunity to examine a number of ingots, and in some cases had found a lack of structural continuity, causing differences in the strength of the steel. When tests were taken along lines parallel to the defects, which were somewhat obscure, the strength of the steel seemed to be normal, but subsequent tests in directions at right angles to the lines of the defects revealed their gravity. The Watertown Arsenal would be glad to have the co-operation of steel manufacturers in the tests it proposed to make, with the view to showing the state of the metal at different stages of its progress through the mill.

Experience on the Norfolk & Western.

Charles S. Churchill, chief engineer of the Norfolk & Western Railway, Roanoke, Va., took issue with Mr. Webster's expression in favor of a heavier section. If it is a correct conclusion that the lighter sections now in use are not sufficiently heavy, the lighter rails still in track should be breaking more frequently than the heavier rails; but this is not the case. The 70 and 80 lb. rails do not break as fast as the heavier sections more recently bought. It appears that there are incipient flaws in many rails that do not develop disastrously until long after the rail has been in use. On a straight section of track in Ohio the Norfolk & Western put down some 75-lb. rails in 1898 which have given good service. Two years ago the road increased the weight of its engines on that division by only 10 per cent., and there developed suddenly a large number of breaks in these 75-lb. rails. Many of the breaks were in the web near the center, some being in the flanges. The latter were crescent shaped. These first appeared in fine hair lines, which gradually grew larger and rusted, the rust enabling the section men to discover the rails and take them out. The speaker's conclusion was that the increase in the load upon the 75-lb. rails above mentioned was just enough to develop their defects. A case was cited of the wrecking of a passenger train due to a break in an 80-lb. rail which had been in service six months. There was no question that this break was due to a flaw from a blow-hole or pipe. The heavier traffic develops and enlarges rail flaws more rapidly now than was the case a few years ago, but if the steel were homogeneous and made as the railroad expected it to be made for the price, and under the inspection given it, many of these breaks

would not occur. If by changing the section a better rail can be secured, that is the thing to do; if by slower processes in the mill, let that change be made; if by cutting off more metal from the top of the ingot, by all means do that. The speaker did not believe any railroad in the country would be unwilling to pay the amount necessary to cover the increased cost. What is wanted is better material.

English and American Rail Steel.

W. A. Bostwick, metallurgical engineer of the Carnegie Steel Company, Pittsburgh, was called upon. He spoke of the paper of Mr. Talbot, referring to a number of tests made of open hearth steel rails. Those rails were of a chemical composition that would not be considered in this country as applicable to railroad service. The open hearth steel used in England, as well as the Bessemer steel used there, is much softer than has been found necessary by the railroads of this country, on account of their very heavy traffic, wheel loads, &c. The speaker asked those who had criticised present practice in the discussion to suggest the proper time to be allowed to complete the reaction after recarburizing in the Bessemer process, but no reply was made.

Mr. Webster presented some figures going to show that if carbon is kept down very good results of drop tests of Bessemer steel are secured, as compared with those for open hearth steel. J. A. Kinkead of the American Locomotive Works, Schenectady, N. Y., cited the statistics of broken rails, as collected by the New York State Railroad Commission for the first three months of 1905, 1906 and 1907, and referred to in *The Iron Age* of May 2, page 1354. The totals for these three months in the respective years were 1331, 826 and 3014. The data would have been more valuable had the causes of failure been given. Mr. Kinkead spoke of piping in ingots and of his observation of its effects in forging billets.

F. E. Kenney, engineer of tests, Pennsylvania Railroad, spoke of the 5-in. camber allowance in the straightening section of the specifications as presented. He considered a 3-in. allowance sufficient. At a recent test rolling at a rail mill the rails were measured after hot straightening and were all found within 3 in. The proposal to take metal from the head of the rail he thought unwise, since 90 per cent. of the breakages are in the head. The base should be increased, but not at the expense of the head.

Lighter Sections on the Atchison Road.

J. W. Kendrick, second vice-president of the Atchison, Topeka & Santa Fé road, spoke of the benefits of re-rolling rails. In 1887 his road had 270 miles of 75-lb. rails in its track between Chicago and Kansas City. Ten years later these rails were removed, re-rolled and placed on the line west of Kansas City, being there subjected to the severest service with the heaviest locomotives. Later they were gradually taken out to be placed on branch lines. That rail has given very much better service, even after its 20 years' use, than the 85-lb. rail put in its place, and that has been the uniform experience of his road. The rails of lighter section give very much better service than those of heavier section. He thought that at some point in the process of rolling the rail should be reheated, and should be given a certain number of passes, allowed to cool until the redness has disappeared, then brought again to moderate rolling heat and given a number of passes to complete the rail. That will give a much better rail than any operation of continuous rolling. The lack of manipulation of the rails in the mill has caused the loss of hundreds of millions of dollars. In the speaker's opinion, unless improvements are made by the co-operation of the mills and the railroads the question will become a subject of legislation.

Breaks Due to Unbalanced Engines.

P. E. Carhart, inspecting engineer of the Illinois Steel Company, touched on the point that had been made concerning high-speed rolling, and affirmed that the rail mill with which he is familiar has the same engines and the same stands of rolls and the trains travel at the same speed to-day as they did 17 years ago. Then it was possible to get an output of 44,000 tons a month; to-day 65,000 tons is done. Where is the difference? Then it

took 1½ hr. to change rolls, taking out one roll at a time and putting back a roll at a time. Now the same thing is done in 20 to 30 min. So it is all along the line. The increase is not by an increase of speed at any point. The increase has been due to the elimination of delays. It is simply a matter of keeping trains occupied and full of steel instead of being idle half or two-thirds of the time. To get a good section of rail, keep the rolls full, keep the mills warm. If, on the other hand, there are intermissions the sections will be slightly off, due to cold mills and beds, and it will be difficult to control the camber and meet the requirements of specifications.

A good deal has been said with regard to crescent-shaped breaks. He had investigated these in a number of cases and found them to be due to impact blows from an off counterbalanced engine. One can measure between the two impacts and by calculations determine the periphery of the drivers, and if well enough acquainted with the motive power of that road can locate the engine that is doing the damage. He had recently made some computations of the impact blow delivered by an off counterbalanced engine. Although it was one of the latest types, at one point of the revolution the minimum pressure on the rail was 4000 lb., and at another point of the revolution the maximum pressure was 57,000 lb. When that is distributed over only a fraction of a square inch, it can be readily seen that a tremendous blow would be delivered by this wheel under high speed travel. In this case the speed was 90 miles per hour, and the crescent-shaped breaks were all on one side of the track. When the track is frozen, so that it is actually a case of running over a concrete bed, such unbalanced engines deliver a very heavy blow.

Moon Shaped Breaks Not Regularly Spaced.

Apropos of Mr. Carhart's remarks on moon-shaped breaks, Captain Hunt spoke of photographs he had seen in the office of the president of the Erie Railroad representing a number of such breaks. In the eastbound track of this road 85-lb. rails were laid and in the westbound track 75-lb. rails. The same engines traversed both tracks. The rails with the moon-shaped breaks, as shown in the photographs, had come out of the eastbound track in every case. Instead of the intervals between these breaks corresponding to the circumference of driving wheels, there were some cases in which three breaks occurred within 6 ft. of each other. He agreed with the previous speaker that the best rails came from keeping the rolls hot and full of steel, but, as all knew, there were cases in which ingots which should have been in the soaking pits 1½ hr. were taken out after 50 min., such was the desire of those in charge of operations to keep the rolls constantly supplied with steel.

Breaks Due to Splice Bars.

Mansfield Merriman called attention to the action of splice bars as a possible cause of rail breaks. In view of the space between the splice bars and the web of the rail, the screwing up of the bolt not only produces a tension in the web, but has a tendency to pry off the head of the rail. The strains upon the web and the head, at right angles to each other, together with the impact of passing trains, made it not difficult to conceive that fractures would begin in the vicinity of the splice bars and extend until the rail ruptured. One remedy for the breaks occurring at the ends of rails would be to put the cross ties nearer together, and another to have the splice bars thicker, so that they could fit close up to the web of the rail.

Robert Trimble, chief engineer of maintenance of way of the Pennsylvania Company's Northwest system, said that while formerly railroads had trouble with breaks at the splice bars, not many rails break there now. The breaks occur 6, 8, 10 and 12 ft. away. Out of the last 100 rails removed on a certain piece of road he did not recall a break at the splice bars.

Heavy Increase in Stresses Upon Rails.

George E. Thackray, structural engineer of the Cambria Steel Company, Johnstown, Pa.: Referring to the statements made by previous speakers that calculations of the stress in large steel rails, including an allowance

of 60 per cent. for impact, shows only 8800 lb. per square inch. This figure seems very much too low when it is known that stremmatograph tests of rails in use indicate that they are actually subjected to stresses of more than 40,000 lb. per square inch. In addition to this, the stremmatograph tests only cover a few isolated cases, and it is reasonable to believe that under other conditions of rough roadbeds, unbalanced driving wheels, flat wheels, &c., the stresses are much greater than 40,000 lb. per square inch. This must be evident when it is known that rail steel which will statically withstand 120,000 lb. per square inch is broken at times by the passage of trains. Further than this, it is improper to calculate the stress in a rail by considering it as a short girder supported on the ties at a distance of about 22 in. apart, for the reason that a rail is virtually a continuous girder extending over many supports and is subjected to a rolling load and accompanying heavy impacts put upon it by a series of wheels located at varying distances, causing by their passage frequent and sudden reversals of stress. Judging from the remarks made by previous speakers, it appears that the railroads have for many years been increasing the loads on their locomotive drivers and car wheels, and have also greatly increased the speed and tonnage on a given line of rails. Mr. Wille has shown that in 20 years wheel loads have increased three times or more. As in the same time the size and weight of rails has only been increased to a very slight degree, it is evident that the endeavor to produce paying tonnages has not been accompanied by an equal effort to increase the strength and quality of the track to carry them. The time is now come when this neglected feature is making itself very prominent.

[Experience with Heavy Sections.]

P. H. Dudley referred to the introduction of the heavy section rails, saying in part:

In introducing the use of 5-in. and 6-in. rails in this country, knowing that the metal in larger sections would require also increased physical properties to sustain the traffic, I insisted upon this in their manufacture. This was opposed generally, except by John Fritz. There are over 1,000,000 tons in service of the 5-in. and higher sections in 75, 80, 95 and 100 lb. rails, which were made in accordance with my specifications, starting in 1884, but particularly in 1891. The tonnage that has passed over some of the 100-lb. rails has exceeded 350,000,000; over others, 300,000,000 tons, and the rails are still in service. From 150,000,000 to 200,000,000 tons is about the limit reached on the 80-lb. rails, except in a few places.

A greater tonnage has been carried by the heavy rails than by the light rails they replaced. I therefore do not concur in the view that the wear has been unsatisfactory upon all 100-lb. rails. I made the fillets under the heads of my sections $\frac{1}{2}$ -in. radii, which makes a stronger support for the under side of the head than those of less radii.

The cold waves of the past winter in most localities were continuous for several days and the weather cloudy, the sunshine not relieving the severe tension set up in the rails during the night. The friction of a 5-in. splice bar is from 4000 to 4300 lb. per lineal inch of its length, and 80-lb. rails might carry a thermal stress of 70,000 to 80,000 lb., and 100-lb. rails 90,000 to 100,000 lb. before the splice bars would render. These or much less stresses, under the falling temperatures, in addition to those of passing locomotives, caused many rails to check in metal disturbed in the straightening presses, and finally to fracture from repeated strains in zero or lower temperatures. The increase in the number of square inches in the section will subject the rails to larger thermal stresses in low temperatures.

The axle loads have doubled in the past 15 years, and the requirements for sound and safe rails exceed what some producers consider ample. The heavy sections when made in ingots of 6000 and 7000 lb. rolled in four or five lengths should be bloomed at first with light draft passes, until the skin is toughened to prevent the numerous checks in the bloom, which are closed, but not rolled out in the finished section and often becomes the incipient point of fracture. The rails in the track besides carrying the vertical loads receive lateral shocks, which often start the fracture in the base of the rail.

Heavy Strains of Brakes.

E. Platt Stratton, chief engineer, surveyor, American Bureau of Shipping, New York, believed that the increased strain upon rails due to the braking of heavy trains with momentum several times that acquired under former conditions, was a factor to be considered. While

these strains had not been computed, it was certain that braking which fairly held heavy trains in suspension produces many flat wheels which in turn deliver heavy impact blows to the rails.

Crescent Shaped Breaks on the Burlington.

Max H. Wickhorst, engineer of tests of the C. B. & Q. Road, told of as many as 50 moon-shaped breaks occurring in a short time on a few miles of track on that line. They were mostly on one side of the track and largely on the inside flange of the rail base. In places on this track oak ties had been replaced with soft wood ties, each of the latter being provided with a tie plate. The breaks occurred in all cases over the ties provided with tie plates, and in very cold weather. Analyses showed the material to be of the usual standard; the probability was that with the rigid track the metal points of the tie plates served to localize the effect of impact of equipment, apparently bearing out what Mr. Carhart had said. In view of the severity of present service he believed a change in design of rail may be needed and a higher grade of material. The percentage of reduction of area would need to be increased.

J. P. Snow, bridge engineer of the Boston & Maine Railroad, had observed moon-shaped breaks in rails, and his tests corresponded to those given by Mr. Wickhorst. He had also found in some rails taken up after breaks evidence of a longitudinal seam in the base of the rail, whether due to gas bubbles or to a lap in rolling, as Captain Hunt suggested, he did not know. The criticism of unbalanced drivers had some truth in it, but the fact was that such engines did not break all the rails, as might be inferred, only the poor ones.

The Specifications I-dorsed,

President Dudley, in closing the discussion, said that the questions of discard and of the segregation taking place in large ingots are important. What is wanted is information as to how better rails can be secured. The present discussion is simply a contribution to the settlement of the issues now raised between manufacturers and the railroads.

A motion was made by Captain Hunt that the specifications be referred back to the committee for further consideration. He believed that since the financial heads and the technical staffs of the two sides were about to decide on some radical action, it would be unwise for the society at this juncture to put forward a specification, and say that it is the best.

In the discussion following this motion, Secretary Marburg referred to the long and arduous labors of the committee in charge of the steel rail specification, and believed that the society, after all that had been done to harmonize the various interests, and after the specification had been approved by the General Committee by a vote of 22 to 2, should now definitely put forward the results of these labors.

President Dudley called attention to the unique position of the American Society for Testing Materials in being made up of representatives of producers and consumers. He believed the society owed it to the representatives of the steel companies and of the railroads who are soon to meet, to offer the pending specification as the best it could do to harmonize the differences between producers and consumers.

Captain Hunt's motion was withdrawn and a resolution was adopted approving the specifications, and ordering their submission to the membership by letter ballot.

Testimonial to President Dudley.

A pleasant interlude to the intense programmes of the technical sessions was the complimentary dinner given to Dr. Dudley at the Hotel Traymore on Friday evening. About 125 members and ladies attended. Dr. Dudley's devotion to the success of the society, and the large part he has had in making its sessions attractive have impressed all who have ever attended a meeting. Friday evening's event was designed to give expression to the unanimous feeling of obligation and good will. R. W. Lesley, Philadelphia, presided over the speaking. The presentation of a silver loving cup to Dr. Dudley was made by Secretary Marburg, and following the recipient's

acknowledgment a number of toasts were responded to, as follows: "Our Cradle Days," Mansfield Merriman, the first president of the society when it was the American Section of the International Society for Testing Materials; "Our Ladle Days," Robert W. Hunt; "Our Friends of the Technical Press," Willard Smith; "Our Friends, the Manufacturers," Geo. E. Thackray; "Our Technological Brethren," Dr. W. F. M. Goss, president of Purdue University. In view of one allusion made in the discussion on steel rails at the Friday afternoon session Mr. Thackray's toast was amended by the addition, "They ain't no angels and don't want to be."

SATURDAY MORNING.

The report of Committee M on Standard Specifications for Staybolt Iron, H. V. Wille, chairman, was presented at the opening of the Saturday morning session. This specification had been submitted in 1905, and the committee recommended that it be now submitted for final action. J. A. Kinkead took exception to two features—the method of piling and the provision for a vibration test. The speaker only knew of one vibration test that checks results, the closest being within 25 per cent. The specifications were referred back to the committee for further consideration.

S. S. Voorhees asked that a committee be appointed to draw up specifications for coal, and the matter was referred to the Executive Committee for action.

A paper on "Results of Tests of Staybolt Iron" was presented by E. L. Hancock. The test showed that the fibers in hollow bolts were more closely united than in solid bolts.

Dr. Dudley said that the staybolt question was in better shape to-day than was the case some years ago. The results of vibratory tests had brought improvements and there was less breakage in service. He suggested that a reduction in the circumference of the staybolt might reduce breakages in plates. Mr. Wickhorst said that this meant a larger number of bolts, which might cause a lodgement of scale.

Committee T, on the Tempering and Testing of Steel Springs and Standard Specifications for Spring Steel presented a report through its chairman, J. A. Kinkead. He asked that those interested work under the specification the coming year and present the results at the next meeting. Henry Southey remarked that the automobile business had driven the spring manufacturers to extremes which they had never known before. Springs would be greatly improved if the leaves were polished and lubricated. The speaker would like to see a test devised

that would measure the weaknesses resulting from the tempering of springs.

Paul Kreuzpointner, chairman of Committee O on Uniform Speed in Commercial Testing, reported the results of an investigation of the effects of speed in testing iron, similar to the investigations previously made of the effects of speed in testing steel. The conclusion of the committee was that in commercial testing of staybolt iron and common wrought iron any speed up to and including 6 in. per minute gives sufficiently reliable results for commercial purposes.

The other papers of the morning were those of G. H. Clamer, on "History and Development of the Alloy Practice in the United States, as Applied to Railway Bearings"; of Prof. Gaetano Lanza, on "Compressive and Transverse Tests of Steel Connecting Rods for Locomotives," and of F. P. McKibben, on "Tension Tests of Steel Angles."

SATURDAY AFTERNOON.

Prof. Gaetano Lanza, chairman, presented the report of Committee K, on Standard Methods of Testing.

The committee had sent out inquiries to important laboratories in all parts of the world asking information as to methods of testing. About 40 replies have been received. Later the results will be tabulated.

S. W. Stratton gave an interesting account of the work and equipment of the National Bureau of Standards at Washington, taking up in turn the various departments of weights and measures, electricity, chemistry, light and heat, testing, &c.

C. E. Skinner of the Westinghouse Electric and Mfg. Company referred to his visits to various European laboratories and to the very favorable comparison with the best of these made by the Bureau of Standards at Washington. He thought that the Bureau should be made a court of last resort for the laboratories represented in the American Society for Testing Materials. The suggestion was on motion referred to the Executive Committee.

The other papers of the afternoon were the following: "The White-Souther Endurance Machine," by H. Southey; "Endurance of Steels Under Repeated Alternate Stresses," by J. E. Howard; "Effect of Combined Stresses on the Elastic Properties of Steel," by E. L. Hancock; "A New Impact Machine," by L. W. Page; "The Development of the Penetrometer as Used in the Determination of the Consistency of Semisolid Bitumens," by Clifford Richardson and C. N. Forrest; "Multiplying Dividers for Locating Yield Point," by J. A. Capp; "An Instrument for Measuring Deformation in Tests of Materials," by H. F. Moore.

THE ENFORCEMENT OF SPECIFICATIONS.

Presidential Address Before the American Society for Testing Materials.*

BY CHARLES B. DUDLEY, ALTOONA, PA.†

In the early days of specifications they were little more than attempts on the part of the consumer to tell the producer what he wanted. Some specifications we have seen consisted of only a few lines, and these either related almost entirely to a brief description of the material desired or embodied some simple tests. Indeed, in the preparation of such specifications, there is reason to think that the consumer himself had meager information in regard to the material he was describing, and perhaps only knew with certainty that the material he was receiving was unsatisfactory, and that he wanted something different.

A Specification is a Contract.

Later on, as knowledge of materials increased, as methods of testing became better understood and more completely worked out, as those who were making specifications learned by experience how difficult a matter it was to draw a satisfactory specification, and especially after it became the custom to consult the manufacturer in making the specification, it took on a new meaning.

At first it was a demand; it now became an agreement. At first perhaps it was often promulgated by its maker with something of a feeling of superiority, and was received by the manufacturer or producer with a feeling of opposition and antagonism. It now became more of a compromise, and was put forth and received with a much more conciliatory spirit on both sides. From being a species of legal instrument that had in it conditions and requirements, that the one who held the purse strings felt that he had a right to insist on, it took on more the nature of a contract, in which the stipulations had practically been agreed upon by both parties in interest.

Specifications Not Self-Enforcing.

Looking at the specifications in this light and assuming as we must that business to be successful, must be conducted in accordance with the principles of honesty, integrity, and fair dealing, it would almost seem that it would be a waste of time and effort to discuss the subject which we have chosen for this paper, "The Enforcement of Specifications." The specification is a contract and, as we have said again and again, in any properly drawn specification both parties have had a voice, differences

* Read at the Atlantic City meeting, June 20, 1907.

† Chemist of the Pennsylvania Railroad.

have been harmonized, and the conditions and stipulations have been agreed upon. If now men are honorable, and intend to do as they have agreed, as we are bound to assume that they are, and do intend to do, what need is there for enforcement? Is it not safe for the consumer to receive and put into use the material which the producer furnishes, without the trouble and expense of maintaining a department or a corps of inspectors to protect his interests? Unfortunately the experience of the business world at the present time does not seem to warrant such a procedure. I doubt not there are consumers within the sound of my voice who if pressed for an answer to our question, would say with a somewhat sarcastic smile, that the situation assumed is utopian, and that with human nature as it is it is absurd to expect to get what you have contracted for unless people are watched. On the other hand, no doubt an equal number of producers who hear us are entirely ready to assert that they are conducting their business in such a way, and are making and delivering such a product in their specification material, that any consumer would be absolutely safe in receiving and using it without inspection. For our own part, as the result of an almost daily experience for now some 30 years with specification material, we are compelled to side with the consumers and to maintain the necessity for inspection and tests.

Sharp Practice the Exception.

There are so many conditions leading to the manufacture and delivery of unsatisfactory materials—that is, materials that do not fill the requirements of the specification on which they were bought—which conditions do not involve the business integrity or the honest intention on the part of producer to do as he has agreed, that we are sure no one need feel aggrieved at the establishment and maintenance by consumers of devices for the enforcement of their specifications. The basis of our discussion is the business truism that a transaction is satisfactory when both parties get benefit from it, and both parties are satisfied. No one believes more devoutly than we do that with few exceptions, that are so few as to be almost ignorable, producers prefer to do an honest business at a fair price and profit, and that they always would do so—if it were not for certain conditions. What, then, are some of these conditions?

Badly Worded Specifications.

In order to avoid constant repetition of the words "materials according to specifications," and "not according to specifications," let us agree that the former may be properly designated "satisfactory materials," and the latter "unsatisfactory materials," the viewpoint obviously being that of the consumer. The first condition we will consider leading to the tender of unsatisfactory materials is improperly worded or unreasonable specifications. It is obvious that the viewpoint of those having to do with either the making or carrying out of specifications being different, and in a sense antagonistic, since their interests are naturally and legitimately opposed, the meaning which they attach to words will be different, and both parties may be equally honest.

We knew of a case once, where a lumberman agreed to buy a large number of logs from the owner of a valuable timber tract, on the simple specification that only two logs from a tree should be delivered. Imagine his surprise when the logs began to come in, to find them small, tapering, and full of knots. On remonstrating, he was told that just exactly as the specification called for, only two logs per tree were being delivered, and he was invited to look at his contract. An inspection revealed the fact that although the lumberman undoubtedly had in mind when the specification was drawn, that he should receive two logs from the butt of each tree, the important word "butt" had been left out. On the other hand, the owner of the lumber tract had unquestionably read into the specification that under it he would be entitled to deliver two logs from the top of the tree. It may be added that a contract covering two butt logs from each tree was somewhat unusual, that the price was lower than would have been expected for such logs, and that as a matter of fact the case never came into court.

Unreasonable Requirements Make Trouble.

In like manner an unreasonable requirement in a specification may lead to the same result. Our friends, the steel manufacturers, are constantly being presented with specifications containing stipulations which it is impossible, or at best only occasionally possible, to fill. Those who have made these specifications have, we fear, neglected one of the prime requisites of a good specification, namely, to consult with, and on certain technical points to be guided by, the best manufacturers. Further it may be urged that a producer has no right to take a contract under a specification he knows he cannot fill. While this is true abstractly, it must be remembered that the producer is in a rather delicate situation. If he remonstrates against the unreasonable requirements he probably loses a customer. If he refuses to take the contract with the unreasonable requirement, and it is well known that this is done again and again, he not infrequently makes an enemy of the engineer or expert, who simply has a crotchet in his head, but is otherwise a very good fellow, and who later may be valuable. So the contract is taken, even with the unreasonable requirement, and with the thought in mind of getting along with the matter in the best way possible if any difficulty should arise. The producer, we fancy, knows that he is making good material and giving good value, and with this thought condones his seeming breach of contract. As far as our subject is concerned, we cannot but feel that an improperly worded or an unreasonable specification is a most potent cause of the tender of unsatisfactory materials.

Mistakes of Subordinates.

Again, the mistakes of subordinates are a frequent cause of the same difficulty. Some years ago a railroad company placed an order with a reputable firm for 50 barrels of the best grade of lard oil, known at the time as "extra," or "prime," the other well known grades being Extra No. 1, No. 1, No. 2 and No. 3. The difference in the cost of the extreme grades was 10 to 15 cents per gallon. The order was what is technically known as a "rush" order. In due time the material arrived at destination and was sampled and tested in the regular way. The test showed the material to be No. 3 oil, and the shipment was promptly rejected and returned to the shippers. A careful examination of the shipment, barrel by barrel, showed that 45 barrels contained oil of the proper grade and of unexceptionable quality, while the five barrels were No. 3 grade. On asking for an explanation, the foreman of the works said that when the order was received he only had 45 barrels of the proper grade in stock, and as it was a rush order he put in five barrels which he knew to be inferior, hoping that the matter would escape detection.

It may be of interest to know that in this case the shippers actually felt themselves aggrieved, and claimed that since they had to pay return freight on rejected material the 45 barrels of good oil should have been retained, and only the five barrels of inferior oil should have been returned. The purchasing agent, on the other hand, very mildly but very firmly reminded the shippers that the order which he had placed with them did not call for any No. 3 oil; that there was a difference in price of at least \$5 a barrel between the two oils, and that if perchance the sample tested had come from one of the barrels of good oil, the shipment would have been accepted without question, and it would have been a clear case of successful fraud by which they would have profited.

But there was considerably more in this case than was brought out by the purchasing agent. Extra or prime lard oil is used by railroad companies almost exclusively in making what is technically known as "signal oil"—that is, oil used in signal lights and in trainmen's lanterns. The safety of trains and even the lives of passengers depend on the reliability of the signal oil, and perhaps more important still, a signal oil made of No. 3 lard oil is utterly worthless and unreliable. The lanterns will commonly go out, and fail completely within two hours after new trimming and filling with such oil. The bearing of all this on the necessity for the enforcement of specifications is too evident to require comment.

Responsibility of Principals.

It would lead us wide of our proper field to discuss the question whether such a mistake on the part of subordinates is ever made with the knowledge and consent of the principals. We have heard it intimated that such transactions are fairly common, and that when they come to the knowledge of the office or the principals one of two things is apt to result. If the shipment has gone through the transaction is closed and no questions have been raised. The subordinate is usually not reprimanded; but, on the contrary, gets a smile of approval. On the other hand, if the fraud is detected and trouble and loss result the subordinate not infrequently suffers.

Poor Materials Innocently Used.

Many instances might be cited of conditions leading to the tender of unsatisfactory materials, even though those who are doing so have a sincere and honest intention of fully meeting the requirements. This condition is that commercial processes do not always yield what is expected of them. Something in the materials used or in the processes employed gives a product that is unsatisfactory, notwithstanding the producer supposed he had done everything that he could to secure a successful result.

Some years ago in our laboratory at Altoona we examined in the regular way a sample representing a shipment of phosphor-bronze bearing metal, from a firm whose business reputation and character were simply above reproach. This material as is well known is an alloy of copper, tin, lead and phosphorus, the percentages of each constituent being fixed within narrow limits by the specification. The analysis showed copper, tin and lead within the limits, but no phosphorus, and the shipment was rejected. This was followed by a visit from a member of the firm, who said he had actually purchased in the market phosphor tin at a high price, and used it in making this very material. It was asked if he knew by analysis how much phosphorus there actually was in this so-called phosphor tin, since our own analyses of the material in the market showed not over a third or at most half of what was claimed. He confessed that no analyses had been made, but stated that he bought the material on a guarantee that it contained 10 per cent. He was then asked if he knew that there was a loss of phosphorus every time the alloy was melted, and that with careless foundry manipulation this loss might readily amount to all the phosphorus he had actually added. His reply indicated haziness on the subject, coupled with a desire to learn. A few suggestions were eagerly noted and apparently well applied, since the same firm subsequently made and furnished to the road large quantities of entirely acceptable material.

Lack of Knowledge by Producers.

A contract taken at too low a figure is a fertile cause of what we have agreed to call unsatisfactory materials. Under stress of competition agreements are made that if carried but strictly in accordance with the specifications would result in loss or lack of reasonable profit. Again, strange as it may seem, a very large number of manufacturers of commercial products do not know the characteristics of their output. They have been making and selling their staple for a period of years, it may be, and as long as the consumers accepted the material they themselves saw no need of making tests and experiments, except perchance such as would lead to diminution of cost in manufacture. Accordingly very little or no knowledge was obtained of those qualities of the material which are of most interest to the consumer. It has been our custom for many years to send our proposed specifications to the manufacturers for criticism before they are officially issued, and we have again and again received from producers in reply to the question, whether they could make a product that would stand the tests of the proposed specifications, the answer that they could if anybody could. There was apparently absolute lack of even the most rudimentary knowledge of those qualities of their product which were of the most interest and importance to the consumer. And yet, without this knowledge, contracts are taken and shipments made. What more natural than that the material should be unsatisfactory in the technical sense of the word?

Again, the tender of unsatisfactory material is often explained, after it has been tested and found wanting by the statement, that although it may not quite fill the requirements it still is good material and will do the work. It takes but a moment's reflection to lead any fair minded person to see that this statement is not at all the question at issue, and that if the consumer had been willing to use a material that is, in the language of the shops, "just as good," he would have specified such material and obtained the benefit of a corresponding variation in price.

Makers Should Tell Their Troubles in Time.

It not infrequently happens after a contract has been made that unexpected and wholly unforeseen difficulties arise in securing raw materials from which the product in question is made. An unexpected demand has sprung up for that kind of raw material, making it scarce in the market, or the parties with whom the producer has a contract for his supply repudiate the contract, or there has been an accident or catastrophe affecting the supply. The producer finds himself in the condition that either he is unable to make deliveries as he has agreed to do or he must, or thinks he must, make deliveries of his product containing such raw materials as he can get, with the accompaniment of that brood of troubles that arise when the tests show unsatisfactory materials. Not once but many times has this situation been prominent in the course of our work at Altoona, and there is one phase of the matter which we have found it most difficult to understand. The producer goes ahead and makes up his product from inferior raw materials and makes shipments, knowing that there will be trouble. Then, when the trouble arises, he explains and asks for leniency. The query in our minds has always been, Why does he not explain and ask for leniency before he makes and ships the unsatisfactory material? If we may trust our experience, a frank statement of the situation beforehand would be far the wiser course. We fancy the reasons for the procedure actually followed will ever remain one of those business mysteries which are incomprehensible to the lay mind.

The Plea That Delay Must Be Saved.

Finally, a most common and pestiferous cause of the tender of unsatisfactory material is the statement that delay must follow if these unsatisfactory materials are not received and used. We say pestiferous because of all the causes leading up to the tender of unsatisfactory materials, this one seems to us to have the least foundation of equity to rest on, and to be the one that smacks most strongly of a deliberate effort to force through an acceptance, regardless of quality. We are quite well aware that emergencies may arise in the case of those who are furnishing materials, which emergencies may fairly be regarded as legitimate causes for an unsatisfactory product. We have already discussed a number of such. On the other hand, we have so many times had occasion to feel that at the last minute materials are tendered which the parties had known for some time, or at least might have known, were inferior and not satisfactory; that the argument that "there will be delay if you do not accept this that we tender" is deprived, in our minds, of a very large percentage of its force. It would be infinitely better not to make shipments, and either to put some of the energy now employed in trying to get unsatisfactory shipments accepted, into making and furnishing satisfactory material, or to make a frank statement of the situation to the consumer beforehand and abide his decision. Such a statement would do much toward smoothing down and removing some of the roughnesses and inequalities of the road the producer and consumer are trying to travel together toward the goal of a successful financial transaction.

The Consumer Must Act for Himself.

From what has been said it is evident that there is necessity for the enforcement of specifications, and that without assuming that men are dishonest or do not intend to do as they have agreed. Under present commercial conditions, and with our present knowledge of the properties of materials and of the processes by which they are made, it simply would not do for the consumer to leave his interests wholly in the hands of the pro-

ducer. Each must look out for his own interests and be prepared to defend and maintain them. The practice of buying and using materials on the reputation of the maker is so deepseated and widespread, and for so many years has been the refuge of engineers in cases of failure, that perhaps the subject safely bears elucidation at a little greater length than would otherwise have been admissible.

Care in Testing Necessary.

But how shall specifications be enforced? We reply, first, the examination and testing of the material tendered must be so planned as to be efficient and leave no loopholes for evasion or the substitution of inferior materials. In the case of some substances every shipment must be tested. In the case of others, as, for example, materials that are produced in heats, or are stored in tanks or bins, the tests deciding their fate may be construed to cover the whole amount, even though there may be a number of deliveries. The essential feature is that each test or lot of tests shall cover a definite amount of material, and that nothing shall be left to the honesty and good intention of the producer or shipper. If we are going to trust the producer in one detail, we may as well trust him in all. The strength of a chain is the strength of its weakest link. No universal rule can be given, but assuming that the specification is wisely drawn and provides only essential tests, these tests must be so applied as reasonably to cover all the material delivered.

Sampling.

Again, since it is clearly impossible, except perhaps in the case of proof strains, to apply tests to all the material in the shipment, it is obvious we must rely on tests of samples, and this brings up the question of sampling. Upon this point several rules are clearly applicable. First, a representative of the consumer must always take the sample. This is in accordance with the principle already enunciated that it is not reasonable or proper or safe to trust the producers in anything by which the validity of the tests might be affected. Not once but many hundred times have we been asked to allow the shippers or producers to send a sample and accept a shipment on its examination. The request was undoubtedly made in good faith and with no other desire than to facilitate the transaction. Perhaps it is needless to say that our belief in the facility with which unintentional mistakes would be made and a sample better than the average of the shipment be sent has always led us positively to refuse such requests.

Second, the sample must be representative of the whole shipment or lot under test. This point is usually provided for in the specifications and does not here require special comment. Nor is it essential, perhaps, to remark on the necessity that the sample should represent a definite amount of material, since this is also provided for in the specifications. However, some specifications seem to us to assume greater uniformity in the product made in successive similar operations than actually exists in the material. If it were at all possible to avoid it, we would not like to accept articles of steel made by the Bessemer process, especially where strength and safety are involved, without a test of each blow.

A third point is that the sample should be taken at random and not always from the same place. We have been surprised to find how intimate the knowledge on the part of the shipper or producer soon gets to be of the practices of the consumer in sampling. Apparently the producer thinks it is just as fair that he should know all about the consumer's use of his material, as that the consumer should know all about his manufacture of it. And this we are quite ready to concede. But now if in sampling a carload of oil, the barrel next to the door is always chosen by the inspector, or if in sampling a pile of axles, the one on top is always selected, or in picking out a spring for test from a lot assembled and offered, if the one nearest at hand is habitually taken, it is perfectly evident that an opportunity is afforded for one of those unintentional mistakes of workmen or foremen that would result in the best material always being tested. It would take us too far away from our subject to discuss here the practice which is so common in many establishments of paying the subordinates, and even the

whole manufacturing organization, in proportion to the amount of successful output. We cannot but think, however, that ingenuity in sampling is a legitimate and reasonable offset to this practice, and that it is as important that the inspector who takes the samples should be full of suspicion and scientific doubt as that testing machines should be reliable, or that a chemical balance should give accurate weights.

An Illustration from the Brass Foundry.

As showing how failure to comprehend the whole shipment in the sampling may result in disaster, and at the same time illustrate the unintentional mistakes of workmen about which we have already said so much, let us cite an incident. A lot of bronze castings were being furnished for use in locomotive construction. The order was a large one, and shipments were made from time to time. The inspection force was pressed with work and, let it be confessed, not quite as much permeated with suspicion and scientific doubt as should have been the case. The bronze was bought on definite chemical specifications, and from each delivery enough sprues were broken off from various castings by the inspector to properly sample the material. These samples were used for the analysis. Deliveries were made usually about three times a week, and the inspector was sent for to inspect and sample the material whenever a delivery was ready. It was explained to the inspector that it would greatly facilitate the work of the foundry if he would allow, say, three-fourths or more of the castings to have the sprues broken off and used over again, before the regular sampling was done. They would leave enough sprues attached, say to a quarter of the castings. Nothing very definite as to the number of sprues to be left attached was promised. In the goodness of his heart the inspector allowed this to be done. A number of shipments were made, sampled, tested, and accepted in this way. Some suspicion having arisen later in the minds of those higher up in the testing organization, some 20 full size castings, all selected from a large number of those from which the sprues had been broken off before sampling, were sent for analysis. The analyses showed that in some manner not explained every one of the samples from the castings bereaved of their sprues by the foundry force were not only not according to the specifications, but showed unmistakable evidence of having in their composition large percentages of inferior scrap. It is perhaps needless to add that from that time forward, after the inspector had been changed, the sprues were all allowed to remain on all castings until the sampling was finished.

Prompt Shipment After Sampling.

This brings us to the last requirement in sampling which we will discuss, viz., the sampled material, as far as possible, should not remain in the hands of the producers after it has been sampled. The equity of this practice will not, we fancy, be called in question; the actual carrying out of the rule is not always so easy. Materials that are sampled and tested, after they arrive at destination, present no difficulties. We have known of refusals to ship until after the material had been tested and accepted, but when it was explained that it would be practically impossible to send inspectors to sample every shipment of every kind of material before it was started on its journey to the service for which it was intended, such refusals have usually vanished. Moreover, the refusal to ship has always seemed to us to argue either a lack of knowledge of the characteristics of the material that the shipper is tendering, or a well grounded fear that it would not stand test. Also in the case of materials such as springs, alloys, &c., which can be inspected and sampled and then loaded at once, there is no difficulty; but in the case of materials which cannot be so treated, or which must be stored, the matter is more serious. In such cases marking in such a way that the marking cannot be defaced without showing it must always be practiced. The chances for unintentional mistakes are too numerous, and the occurrence of such mistakes too common to permit of any uncertainty on this point.

Representative Character of Samples.

Perhaps you will bear a word on the question, whether a sample taken with all the known precautions does, as a

matter of fact, actually represent the shipment. The sample is but a very small fragment of the shipment, and a doubt fairly may be felt as to whether the whole shipment is like the sample. It is obvious that if the specification is intelligently drawn, all the variations in the material due to uncertainties in the process of manufacture or unavoidable errors of manipulation are provided for in the sampling which it directs. This leaves only intentional or unintentional variations introduced by the producer to be provided against. Our position in regard to these has always been that if the producer was willing to take the risk of our getting our sample from one of these intentionally inferior parts of the shipment, with the rejection which would inevitably follow, we were willing to take the chance of getting a sample from a better part of the shipment, with the consequent acceptance of some inferior material. Moreover, in cases of reasonable doubt, we have a number of times sampled every part of a shipment, and are strong in our belief that very few commercial men would persistently offer material, portions of which they knew to be inferior.

Retesting Opposed.

But, again, let us discuss another phase of our theme. Let us assume that the specification has been wisely drawn, that a shipment has been properly sampled, and that the tests show that it does not fill the requirements. What is the next step? In our own daily work but one thing is ever done—the material is rejected. None of our specifications provides for a second or third sampling and corresponding tests. Our theory is that the material ought all to be of the grade called for by the specifications, since this is what the consumer has bargained for, and if this is the actual fact one sample is as good as 50. We are quite well aware that there are many specifications in force which provide for second and if need be third tests, the fate of the shipment to be decided by the majority. But this has seemed to us to be a survival of the crude early days of testing, when neither producer or consumer knew much about materials, and which it is high time should be banished forever. If a specification is so severe that only two-thirds of well made material will stand test, the specification should be changed, and if a manufacturer can only make a product two-thirds of which will stand test, he should either learn how to improve his product or go out of business. Testing was never intended to be a device to bring about the acceptance of inferior material; quite the contrary. Moreover, from three samplings and tests it is but a step to five or seven or nine, and perhaps if sampling and test are long enough indulged in, a majority may ultimately be found which will always bring acceptance of the material. Surely the interests and responsibilities of the consumer cannot be trifled with in this manner.

The Reliability of Tests.

But some one says, Are you so sure that you are right in your single test, that you feel that you are on firm ground in rejecting material and cutting off all chance for further tests? We reply, That is quite another matter. Retesting because the material fails, no question being raised in regard to the reliability of the tests, is entirely different from a retest because there is reason to think there is something wrong with the sampling or testing. In this case the burden of proof is on the producer, and it is incumbent on him to show reasonable ground for reopening the case. On the other hand, it is equally essential that the consumer should welcome the investigations of the producer; should throw everything open to him, and give him every facility for satisfying himself that no injustice has been done. There is no room for a star chamber in the enforcement of specifications. In our own laboratory we always keep the sample of every rejected shipment for a month, and are always ready to give the producer half of our sample for verification purposes. Moreover, we have often said to shippers who were interviewing us over rejected material: "You may follow your material from your works to destination, you may see the sampling, may follow the sample to the laboratory, and either by yourself or your technical representative be present and watch the whole operation of the testing; and, finally, here is half the sample on which we have worked. Put it in the

hands of any reputable chemist, and if he does not confirm our results, we will take up the question with him and find out who is in error." Our sincere desire is to get at the truth, and we cannot put it too strongly, there should be nothing unfair or secret or arbitrary on the part of the consumer in rejecting material. On the other hand, the sampling and testing being fair and honest and reliable, there should be but one sampling and testing and no retests.

The Use of Rejected Materials.

Closely related to the point we have just discussed is the question of the use of rejected materials. It is safe to say that hundreds of times during the past 30 years it has been said to us: "Yes, it is true the material does not quite stand test, but cannot you accept and use it?" Only a little less frequently the same request has been made of those higher in authority in the organization. The argument usually is: "The material will give you good service; not quite as good as if it had stood test, but still on the whole fairly satisfactory." Also: "We are good friends of yours, and would do the same for you." And still further: "We are very large shippers over your line and think some concession is due to us in view of this fact." There is apparently complete failure on the part of those using these arguments to comprehend the position in which they are placing the officer to whom these requests are made. Let us see if we can look at the matter from his point of view. It takes but a moment's reflection on the part of any fair minded person to enable him to see that to grant the request means a complete breaking down of the specifications. The officer in question is usually responsible for the specification. He has made and issued it after careful consultation with those who are to furnish the material. The requirements have been agreed to, and a contract has been made with the purchasing agent or other officer to furnish material that would stand test. If now the specification is to be waived in one case why not in all, and what then becomes of the specification? Still further: A shipment of the kind in question once accepted becomes a precedent for the next case, and so on indefinitely. Moreover, apparently also another and very important point is forgotten—namely, it is simply unfair and unjust to those who are furnishing material which does fully meet the requirements to accept shipments from others who fail in this respect. Much of the obloquy at the present time affecting those in authority in large organizations using large quantities of material is legitimately and reasonably based on cases of this kind. It is claimed, and justly so, that certain parties have a pull, and are able to do business with the organization in question, while others who are striving to be absolutely straightforward and honest and to do as they have agreed are entirely unsuccessful.

The Question of Safety.

Moreover, there is another phase of the case. It may chance that the rejected material is of such a nature that the use of it would only involve a slight financial loss. This point we will refer to in a moment. But, on the other hand, the rejected material may be of such a kind that the question of safety to passengers or risk to human life is involved in its use. In this last case it seems to us that there can be but one answer to the request to use unsatisfactory material and that is, "Nothing could induce us to accept and use this material." And in the case where only a money loss is involved we are clear that there is only one condition under which it is at all admissible to accept and use rejected material. It has been a puzzle to us how completely manufacturers and shippers lose sight of this condition. If among the arguments used to get the rejected material accepted the shippers would only urge, "It is true the material is not quite what we have agreed to furnish and in view of this fact we will deduct a certain amount from the bill," their case would stand on firm ground and might have a reasonable expectation of success. Fairness and the ultimate satisfaction of both parties to a transaction are the only basis upon which successful business can be continuously carried on.

This whole matter of multiple tests, retests and the disposal of unsatisfactory material, can be summed up in

a few words. Multiple tests are pernicious and should be abandoned. Retests, including the sampling, should never be made unless there is reasonable evidence to think there is an error somewhere in the first test; and to decide this point every reasonable facility should be furnished by the consumer to the producer to enable him to satisfy himself. Shipments of material once fairly rejected should never be accepted and used if the material is of such a kind that safety or risk to human life is involved; and finally, it is suicidal and brings with it a train of almost unmanageable subsequent conditions to accept rejected material in which only commercial considerations are involved unless there is some abatement in price.

Material Almost Up to Standard.

It not infrequently happens that when the tests are applied to the sample it is found that it almost but not quite fills the requirements. What should be the procedure in such a case? The answer is not quite so easy as might seem at first sight. It is well known that the ruling which prevails in many locations, especially abroad, is that the material fails and should be rejected. For example, suppose the specification requires not above 0.040 per cent. of phosphorus in the steel, and the analysis shows 0.043 or 0.045 per cent. Shall the material be rejected? It is plain that the accuracy of chemical work is involved. Now it should be confessed openly and plainly that no test gives absolutely accurate results. One of my old instructors used to say: "No chemist can make an absolutely accurate analysis. Even though the chemist himself were infallible, the methods will not give absolute results. There are chemists who can work near enough to accuracy so that their results are useful and there are others who cannot." And the same is true of physical tests. Testing machines are not absolutely accurate, and strictly accurate measurements are very difficult to make. How, then, shall these inevitable inaccuracies be handled? †

In our own laboratory, no shipment is ever rejected until the test has been duplicated, and sometimes three or four tests are made. But this still leaves the unavoidable small inaccuracies unprovided for, and they must be provided for in some way, as not rarely acceptance or rejection turns upon them. Two ways of meeting the difficulty have been suggested. One is to have it a part of the specifications, and to have the producers clearly understand, that the limits of the specifications cover the inevitable and unavoidable errors of testing. That is, the manufacturer should work far enough within the limits of the specifications so that the inevitable and unavoidable errors of testing would never lead to the rejection of a shipment. The other way is to make the limits of the specification sufficiently narrower or wider, as the case may be, to cover these unavoidable and inevitable errors of testing, and then allow for them in deciding whether to accept or reject. The latter procedure is the one we have always followed in our laboratory. An illustration will make the whole matter clear: For certain purposes, steel containing 0.040 per cent. of phosphorus will give us perfectly satisfactory results in service. But knowing that chemists will differ, and that there are inevitable and unavoidable errors in the analysis, we make the upper limit of phosphorus in the specification 0.03 per cent., knowing that such steel can readily be obtained in the market without undue hardship to any one. It is evident we have by this procedure sufficient margin to cover inevitable and unavoidable errors in the determination, without raising questions which involve contention and hair splitting. It is infinitely better to so draw the specifications that the service will be protected by a sufficient margin to afford good strong fighting ground, and then when a rejection is made stand by it to the bitter end. One of the most used rules of our laboratory is: Never reject a shipment unless you know beforehand that so far as the figures of the test are concerned, you will win in the contest which may follow the rejection.

Reimbursement to Producers.

Again, let us suppose that a shipment has been wrongly rejected, and that the shipper has been put to

expense in regard to it. Is any requital due him for this loss, or must he regard it as one of the inevitable expenses of doing business? We answer unhesitatingly that in the case supposed there is only one thing to be done, and that is for the consumer to make good the loss due to the erroneous rejection. It is a poor rule that does not work both ways.

We should like to discuss several points further in connection with our theme—notably, What shall become of rejected material? How far has the consumer a right to protect himself against such material? Especially, has he a right, and is it good policy for him to so mark rejected material that it cannot be offered again? Still further, we should like to bring before you the question as to whom shall make good the annoyance and frequent money loss experienced by the consumer due to rejected materials. It is always annoying and often necessitates expensive delays and rearrangements to reject a shipment. Also, what penalty, if any, should the producer pay to requite the consumer for this annoyance and loss? Our subject is not nearly exhausted, but we have already taken too much time.

Responsibility for Human Life.

In conclusion we present briefly a problem which has had lodgment in our own brain for some time, and which recent events in regard to certain materials have seemed to force into prominence. It is plain that in using materials in those constructions which involve safety in the railroad sense, or risk of human life in the public sense, there is a question of responsibility involved. If rails are defective and break; if an accident with loss of life results from the use of poor material in car construction; if a bridge falls and produces a disaster due to inferior materials, or a building collapses from the same cause, it is clear that some one should be held responsible. And since there are but two parties involved in the materials—viz., those who make them and those who accept and use them—it is difficult to see how one or the other of them is going to escape the responsibility. Our problem is, Which of the two in equity should be held responsible? It is, perhaps, hardly wise at this time to attempt a definite answer. Much might be said on both sides, and probably no two persons, certainly neither of the two parties most interested, would give the same answer. But there is a phase of the case which we would like to present. It is well known that in the earlier structural work, when safety was involved, there was no testing worthy the name, and materials were bought and used on the reputation of the maker. Fortunately, the constructions in most cases had a high factor of safety. When disaster did come, if it was due to defective materials, it was explained that the materials used were from those of the highest reputation in the business, and that no one could really be held responsible.

At the present time conditions have changed. The knowledge of the properties of materials of construction has increased, methods of testing and testing appliances have grown up in delightful profusion, and it is to-day entirely possible, we feel safe in saying, for an engineer to be reasonably sure that defective material does not go into his structures. We waive here the discussion of commercial considerations as affecting the use of materials. If it is shown that these have led to the use of defective materials, the moral responsibility for loss of life must certainly go to the one who has allowed commercial considerations to have such undue weight, be he the maker of the material or the one high in authority who has allowed it to be used. But the point we want to make is, in view of present knowledge and present means and appliances for testing, are engineers or their principals any longer entitled to offer as an excuse for defective materials that they were bought from the best makers? Can they equitably do so? Can they legally do so? Is not the time near at hand when engineers and their principals will be compelled, if not legally, then by force of public opinion, to acquire by the establishment of laboratories and means of testing, by the making and enforcement of specifications, such knowledge in regard to the materials they are putting into structures as will give the public greater security than it now has against disaster?

Open Hearth Steel Rails.*

Results from the Continuous Process.

BY BENJAMIN TALBOT, MIDDLESBROUGH, ENG.

As we have been rolling for some little time past heavy flat bottomed rails from steel made from phosphoric Cleveland pig iron by the continuous open hearth process with which my name is connected, at one of our English works, I have been asked by W. R. Webster

coupled with a very high yield of steel ingots from a given weight of pig iron, as compared with ordinary open hearth practice.

Steel rails have been made by the continuous process both from molten pig iron and also from Bessemerized metal fed into the steel furnace. In the latter case it is purely a question of the cost of Bessemerizing and small basic additions, as against the cost of a large quantity of oxidizing material otherwise required to convert the crude molten metal. Manifestly a 200-ton continuous steel furnace when fed with blown metal from the Besse-

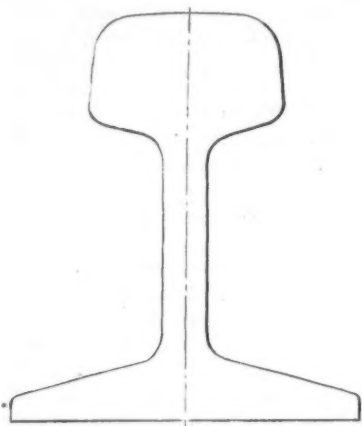


Fig. 1.—Standard Section in Use.—Area of Top Section, 4.46 sq. in. Bottom Section, 3.32 sq. in. Area of Whole Section, 9.76 sq. in. Weight Per Yard, 99.54 lb.

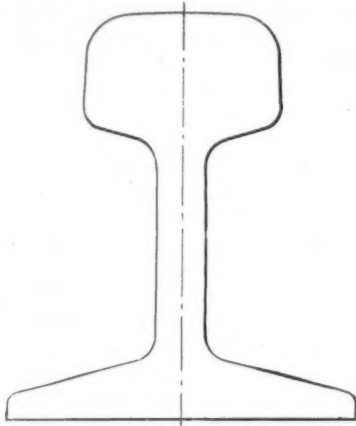


Fig. 2.—Area of Top Section, 4.75 sq. in. Bottom Section, 3.32 sq. in. Area of Whole Section, 10.18 sq. in. Weight Per Yard, 103.7 lb.

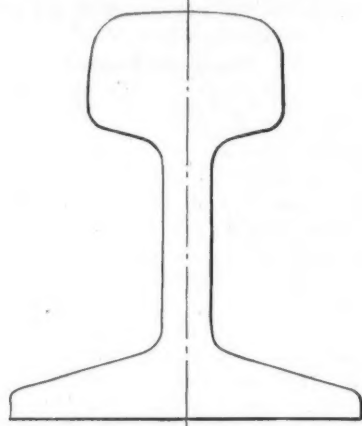


Fig. 3.—Area of Top Section, 4.75 sq. in. Bottom Section, 3.65 sq. in. Area of Whole Section, 10.41 sq. in. Weight Per Yard, 106.05 lb.

[chairman of the Committee of the American Society for Testing Materials on Standard Specifications for Iron and Steel] to submit a short paper dealing with the results obtained from such steel. We have not been able to submit any results relating to the life of the rails in actual service, owing to the short time that we have been manufacturing them, but I have obtained from the officials of the works details of some specially severe tests some of these rails were subjected to, together with the ordinary mechanical and chemical tests of these charges,

mer converter will produce a very large output of ingots, probably some 3000 tons per week or more. In either case the steel rail made is equally good, as a high carbon, low phosphorus product is obtained, and under such conditions four or five of these furnaces would keep an American steel rail mill busy.

High Carbons Possible.

The rails, of which details are given below, were made from high phosphorus pig iron (about 2 per cent.) far more difficult to treat than the majority of American

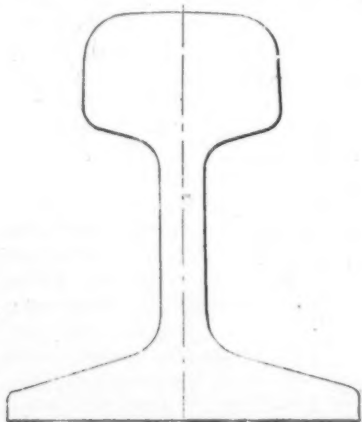


Fig. 4.—Area of Top Section, 4.75 sq. in. Bottom Section, 3.99 sq. in. Area of Whole Section, 10.7 sq. in. Weight Per Yard, 109.01 lb.

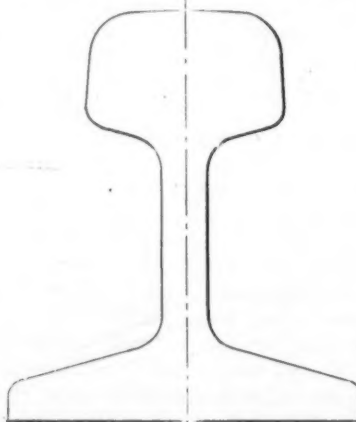


Fig. 5.—Area of Top Section, 4.75 sq. in. Bottom Section, 4.32 sq. in. Area of Whole Section, 11 sq. in. Weight Per Yard, 112.068 lb.

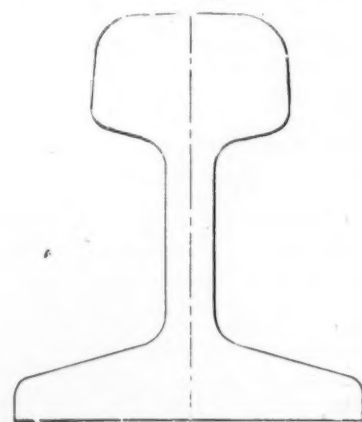


Fig. 6.—Suggested Section.—Area of Top Section, 4.75 sq. in. Bottom Section, 4.6 sq. in. Area of Whole Section, 11.3 sq. in. Weight Per Yard, 115.5 lb.

which will enable one to judge of the very tough nature of the steel obtained.

The continuous process is really only a modification of the open hearth system of steel making, and the product obtained is absolutely open hearth steel, so that we are not dealing with any untried product. From a metallurgical point of view the use of this process offers several advantages over the ordinary open hearth process, which it is not here necessary to enter into. It will suffice to say that the essential advantages are the production of very large outputs from a given unit of plant,

pig irons. If we had to treat a pig iron similar to that used in the acid Bessemer in America, containing about 0.1 per cent. phosphorus, we should, without taking any pains to do so, lower this phosphorus to 0.03 per cent. or thereabouts, which is obviously an excellent material for rail purposes, as the carbon can be varied at pleasure. That is, it is practically as easy to make 0.7 to 0.8 per cent. carbon steel as it is to make 0.4 per cent. carbon steel. It is found also from practical experience that the steel from the continuous bath is somewhat less oxidized than steel from the ordinary open hearth furnace. This is proved from the fact that a given weight of ferromanganese will increase the manganese in the steel rather

* A paper read at the Atlantic City meeting of the American Society for Testing Materials, June 21, 1907.

more in the case of the Talbot steel than in ordinary open hearth steel, for which reason in practice we add rather less ferro than is required in other open hearth furnace practice.

The treacherous nature of steel high in carbon, manganese and phosphorus is too well known to need dwelling upon, and any increase in the carbon accentuates this danger. A point, however, which has not been so much dwelt upon is whether high carbon steel, even though low in phosphorus, is not in some cases dangerous, due to the fact that segregation will take place, sometimes to a very marked amount.

The statement has recently appeared in print that the Pennsylvania Railroad has specified that the open hearth rails which they propose to call for in future must have 0.8 to 0.9 per cent. carbon, for 90 to 100 lb. rails, with 0.03 per cent. phosphorus. Undoubtedly this steel should form a very excellent material for rail purposes, if it could be guaranteed that no segregation of the carbon would take place, whereby one part of the rail might become still higher in carbon, and so cause the material to become more brittle. It will be of interest to learn how such higher carbon rails behave in practice, and especially how they stand shock under low temperatures. Possibly rails with 0.75 per cent. carbon, 0.03 per cent. phosphorus and with manganese not above 0.7 per cent. will give the best results.

We could not fill the requirements demanded by today's specifications with Bessemer steel made from such raw material as is available generally in the United States.

Results of Drop Tests.

We append a schedule of tests giving the mechanical results, also the analyses of the steel and molten pig

with head and flange of equal area. This would be as near as it would be possible to approach the perfect design with T rails, though a reduction in height might improve it. Nos. 2 to 5 are intermediate steps or compromises between what we are actually rolling and what we would suggest is the best section. How far would the railroad engineer be prepared to go in this direction?

If the matter is carefully gone into, it will be demonstrated beyond any doubt that section No. 6 is a much stronger rail than is accounted for simply by the increase of weight, because with rail No. 1 great strains are already existing before any load is put on. Another beneficial direction to go in is the increase in the radii of the fillets which join web to flange and head respectively.

Method of Rolling.

In the formation of the grooves in the rolls much damage can be and often is done to the steel. With the object of increasing the product of a given mill, the ingot is rolled off at one heat, with heavy reductions in each pass so as to reduce the number of passes and consequently the time taken in rolling. Our practice is to take large ingots and have a furnace between the blooming and finishing mills, which has the effect of acting as an equalizer so that the blooms are delivered to the finishing mill at an even temperature right through, making the bar more easily shaped, and the flange of the rail is sent out of the finishing groove at a temperature nearer to that of the head than has hitherto been possible.

This does no doubt lessen the strains set up in cooling on the hot banks. Our practice is to increase the number of passes, decrease the amount of reduction per pass, and get the product by increased speed of the rolls and not by digging into and tearing the metal as is done in

Record of Test of Steel Rails Made by the Continuous Open Hearth Process.

Number.	Analysis of steel.						Tensile tests.		Deflection on drop of 1 ton 30 ft., 3' 6" centers.*		Analysis of pig from which steel was made.	
	Carbon required.	Carbon.	Silicon.	Sulphur.	Phosphorus.	Manganese.	Tons per square inch.	Elongation in 3 in.-%	Inches.	Blows.	Silicon.	Phosphorus.
1.	.55 to .65	.59	.019	.042	.037	.77	51.0	12.0	13.4	3 3/4	.89	.13
2.	.40 to .50	.49	.031	.046	.065	.94	52.6	11.0	9.7	3 3	.93	.09
3.	.40 to .50	.49	.046	.04	.032	.92	49.7	12.5	11.3	3 3/4	.84	.116
4.	.40 to .50	.46	.046	.066	.026	.816	42.2	13.0	14.3	3 3/4	.93	.085
5.	.40 to .50	.43	.04	.071	.048	.756	40.8	18.0	18.7	4 1/2	.70	.083
6.	.40 to .50	.47	.037	.038	.04	.806	46.0	13.0	16.3	3 3/4	.117	.099
7.	.40 to .50	.48	.031	.029	.039	.855	47.3	13.0	15.3	3 1/2	.79	.113
8.	.40 to .50	.45	.05	.05	.061	.716	43.0	15.5	12.2	4 3/4	.79	.09
9.	.40 to .50	.44	.035	.059	.036	.723	40.2	16.0	18.8	4 3/4	.75	.103

* Alternate blows, beginning with the second, delivered with the base of the rail up. Blows for which deflection is given were on the head.

An attempt was made to test all the above to destruction under the drop test, but with the exception of Nos. 3 and 7 it was found practically impossible to do so, owing to the tough nature of the steel and the twisting of the sample.

from which such test was made. This steel is basic open hearth made by the Talbot continuous process. From these figures it will be seen that these rails were subjected to a much more severe mechanical test than is ordinarily called for by engineers. One ton dropped once on to the head after the rail is placed on supports, 3 ft. 6 in., centers is what is asked for.

With regard to the drop tests in the above schedule: The first drop is with the head up; the rail is then reversed, and in each case came practically straight upon reversal.

Increased wheel loads can only be met by the introduction of a stronger and heavier rail. The tendency in designing T rails in the past has all been in the direction of big heads, thin webs and flanges, together with increased height. In the manufacture of such a rail it is almost impossible to avoid internal strains, set up in cooling on the hot bank. The duty of the rail designer is to design a rail which will cool straight when laid on the hot bank without cambering. This is only practically possible with a double headed rail—a rail with both heads of equal areas. In designing a flat bottom rail this condition should be approached as near as possible.

Changes in Section.

Figs. 1 to 6 show a set of sections, No. 1 being a fairly representative 100-lb. rail. No. 6 is a suggested section

the case where too few passes and heavy drafts are adopted.

With regard to rolling temperature, we may say we roll a 100-lb. rail in lengths which give, after crops are cut off, three lengths of 10 metres. The first length is cut within 15 to 20 seconds after leaving the finishing groove of the mill and on this we allow 7% in. shrinkage. The next length is cut within 35 to 50 seconds from leaving groove, and here 7 1/4 in. is allowed. The third is within 60 to 80 seconds and 7 in. is allowed for shrinkage. Of course, these allowances only apply to 100-lb. rails; less allowance is made in lighter rails.

An interesting experiment may be tried on a T rail, which has been finished and straightened. Take 6 or 8 ft. of rail and place it on a planing machine and cut the head off the web. Both the head and bottom portion will spring out of a straight line, sometimes to a very marked extent, thus showing that great internal strains are there. This is a condition that cannot be avoided by the manufacturer without some help from the rail designer.

As rails increase in weight, the ingot from which they are rolled must also increase in size, if sufficient work is put upon the rail. If high phosphorus has been permitted for smaller ingots rolled into lighter rails, the same average phosphorus should not be permitted in the larger ingot, as greater segregation will occur.

The Eberhardt Brothers No. 2 B Gear Cutter.

A machine particularly intended for cutting lathe and milling machine change gears, feed and adjusting spur and bevel gears, and for milling face clutches, cutters and saws is shown in the accompanying illustrations. It is also, however, suitable for all cylindrical or conical work requiring automatic milling where either accuracy or rapid production, or both, are essential, and is designated by its manufacturer, the Eberhardt Brothers Machine Company, Newark, N. J., as the No. 2 B automatic spur and bevel gear cutting machine.

The machine has a capacity of 24 in. diameter, 6-in. face and 8-in. diametral pitch in steel at a good feed. The construction follows the general design of the line of machines of this company, of which the No. 5, illustrated in *The Iron Age* May 30, 1907, is typical, except where its size allows of different applications of the same principles. An example of this is shown in Fig. 2 in the bevel gear drive to the cutter spindle, providing an efficient drive especially adaptable to the high spindle speeds required by high speed steel cutters. The changes of

The illustrations show the work spindle with a 60-degree center and a dog driver, which equipment is useful when milling flutes in taps and reamers, cutting gears on ordinary lathe mandrels, cutting pinions solid with the shaft, &c. The center has a taper shank fitting the work spindle hole, and is drawn in and forced out positively by a bolt operated by a handle at the back of the work head. The usual taper and shoulder nut arbors can be used for cutting gears. The spindle is of machine steel and the hole in its center takes a No. 10 B. & S. taper.

The cutter arbor is solid with the cutter spindle on this size and takes cutters with 1-in. hole. The chips are caught in the box on the side of the machine and the oil runs through, being caught in the ample reservoir formed around the frame of the machine. After filtering it passes again through the oil pump, which delivers a constant stream of cutting lubricant and can be adjusted to regulate the supply.

The Passaic Steel Company, Paterson, N. J., has closed its steel plant for the present and will confine its

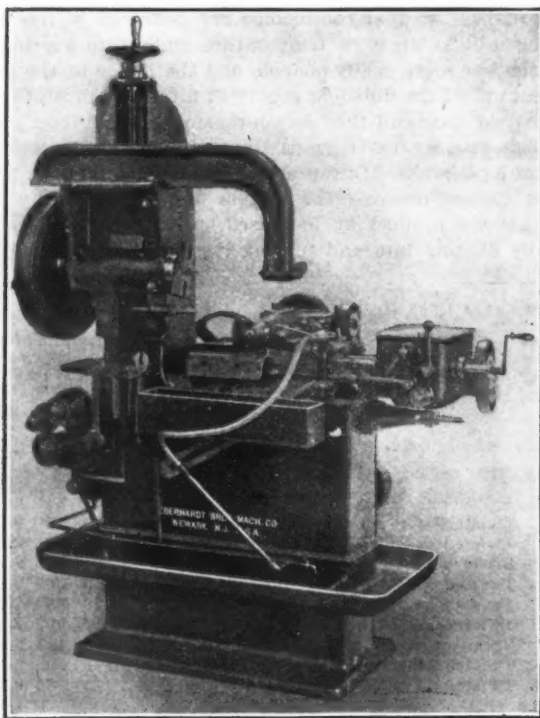


Fig. 1.—The No. 2B Gear Cutter Built by the Eberhardt Brothers Machine Company, Newark, N. J.

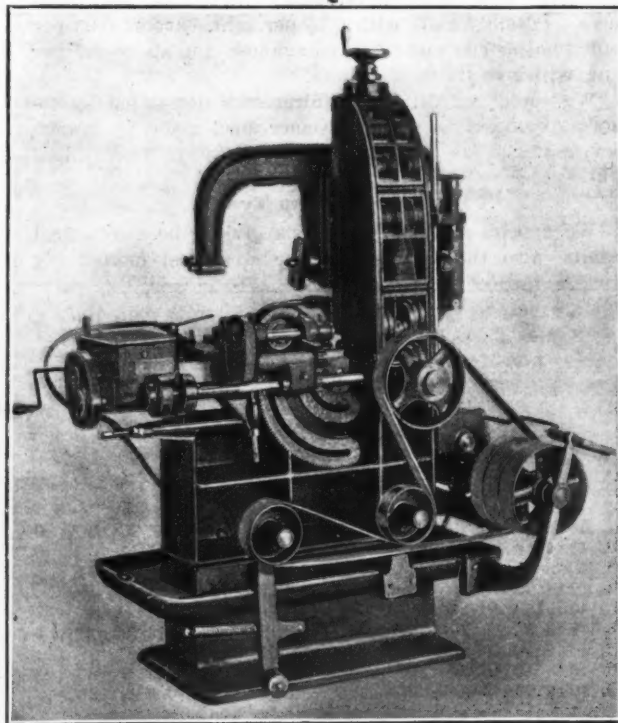


Fig. 2.—A View of the Opposite Side of the No. 2B Gear Cutter, Showing the Drive.

spindle speeds are obtained by means of gears immediately driving the bevel pinion.

A segment graduated in degrees provides for cutting bevel and miter gears. It is operated by means of a worm, meshing in teeth in its periphery, thus allowing convenient adjustment. The slide can be raised to 90 degrees, and with it the machine is made particularly suitable for such work as milling face clutches, &c. A long slotted link strap is shown in the front view of the machine, Fig. 1, which is used as a brace to give additional stiffness to the slide when raised.

A screw is provided for adjusting the lower slide toward or from the column, to allow for different lengths of hubs on the work. A dial graduated to thousandths of an inch facilitates such settings. Graduated dials are also provided on the indexing worm and on the cutter spindle bearing for rolling and shifting when cutting bevel and miter gears, and on the depth adjusting screw for setting the proper depth to be cut.

The indexing mechanism is positive and operates the master wheel, which, as can be seen, is large for this size machine. The outside support to the work arbor is adjustable for different lengths of arbors, but is always centered opposite the work spindle. This is especially convenient in a machine of this class and allows rapid setting.

operations to its fabricating shop. The following statement was given out June 21: "The directors of the Passaic Steel Company have concluded, in consequence of the large and continued advance in the price of raw material, with no increase in the market price of the finished product, to discontinue temporarily the departments devoted to the making and rolling of steel, so soon as present orders are completed, and to devote their full energies to the bridge and beam departments, which constitute a large portion of the works, it being their intention to greatly increase the capacity of these departments. The company has a large tonnage of orders on its books for the output of the bridge and beam departments, and expects that this change will not decrease its shipments to any considerable extent."

Progress in the construction of large gas engines is shown by the fact that there are now in Great Britain 119 of 500-hp. and upward, giving a total of 96,000 hp., or an average of 807. In Germany the number is 380, and the total horsepower, 421,150, or an average of 1108. In Belgium are 55 engines, aggregating 61,400 hp., or an average of 1116. Perhaps the largest unit yet built is the 5000-hp. engine of Erhardt & Senmer, which has four cylinders, measuring 45 x 51 in., and operates at 90 rev. per min.

The Stubblebine and Smythe Iron Melting Furnace.

Illustrations are herewith given, which present the leading features of a furnace, which has been brought out by William Stubblebine and H. E. Smythe of the S. R. Smythe Company, Pittsburgh, Pa., for use in connection with iron rolling mills. This furnace has been designed, with the object of improving the quality of the iron, making the rate of production more rapid and at the same time diminishing cost. The principle of the furnace is described as follows:

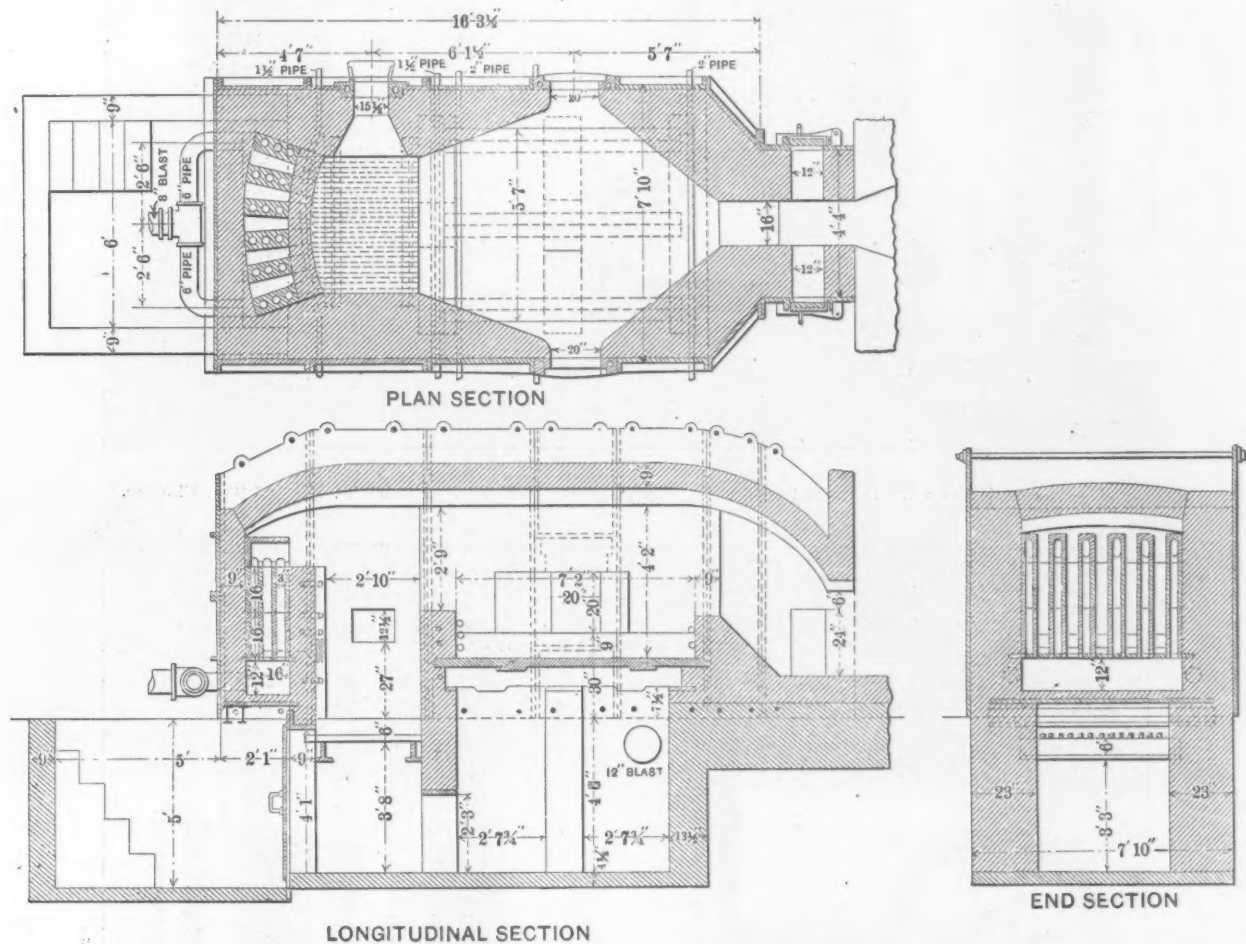
The fire chamber is much deeper than in an ordinary furnace, being about the same as that of a producer for generating gas. A blast pipe 12 in. in diameter is introduced under the bottom of the furnace, and the incoming air at that point is heated by radiation from the furnace and emerges under the grate bars, thus blowing the

greater output, using scrap and cast iron turnings with a consumption of 240 lb. of ore to the ton. It also saves from 25 to 35 per cent. in coal.

This furnace is used in connection with the ordinary puddling furnace, but the inventors have made another move toward increasing the output of iron at reduced cost and of a superior quality by designing a mechanical puddling furnace, which they will have in operation in the near future.

Boilers for the utilization of the waste heat are installed with these furnaces, thus regenerating steam free of cost for operating the machinery. Several of these furnaces are now in operation, treating iron products whereby high temperatures are maintained uniformly with greatest efficiency, both as to consumption of coal and the utilization of waste gases for generating steam. In fact, practically all the combustible matter contained in the coal is utilized and consumed.

The inventors of this furnace have had in view the



Sectional Views of the Stubblebine and Smythe Iron Melting Furnace.

fire from the bottom. A recuperator is built back of the fire chamber with a second bridge wall, this recuperator having alternate air and heat flues. Part of the heat from the combustion chamber passes up through ports and through these heat flues. Two blast pipes 6 in. in diameter are introduced at the back of the recuperator under a plate, and the blast from them passes up through the air flues parallel with the heat flues. A cover of brick or tile is placed over the top of both sets of flues. The blast passing over the top of the main combustion chamber ignites the escaping gases, and they are consumed before the blast enters the furnace over the main bridge wall. The blast introduced, both through the recuperator and in the fire chamber under the bottom of the grate bars is under 5 to 6 ounce pressure. As both applications of blast are preheated, a complete combustion is assured of the gases and coal with economical results and high temperatures, almost equal to those of the regenerative furnace. As compared with other methods now in use, this secures 25 to 30 per cent. greater output with all pig iron and ore, or 40 to 50 per cent.

fact that for many purposes iron is preferred to steel, but in order to secure such business it is necessary that the makers of iron be placed in a position to furnish an iron product of high quality at but a slight difference in cost as compared with steel.

Remington Typewriter Bonus.—The ninth semi-annual bonus distribution at the Remington typewriter factory, Ilion, N. Y., owned by Wyckoff, Seamans & Benedict, took place June 21. A total of \$14,450 in gold was divided among 280 persons. This number out of 1700 employees had worked from 10 to 34 years continuously with the company, and had qualified as well on the score of diligence and efficiency. The list included three 34-year men, 11 25-year, 36 20-year, 94 15-year, and 145 10-year men.

George M. Bole has been appointed receiver of the Bair & Gazzam Mfg. Company, Pittsburgh, manufacturer of cut gears and other machinery.

Producer Gas for Power.

BY JAMES A. CHARTER.

Theoretically a gas engine has the advantage of a much higher thermo-dynamic efficiency than any other heat engine. Practically this superior efficiency is not all

duces about 75 cu. ft. of gas containing 135 B.t.u. per cubic foot. This is approximately the equivalent of 10,000 B.t.u. per horsepower-hour. About 12 to 12½ cu. ft. of natural gas, having a heat value of 1000 B.t.u. per cubic foot or 12,500 B.t.u. of this gas, is required to give the same result, showing that the producer gas engine has a greater thermal efficiency when using lean gas made direct from coal. That the internal combustion engine

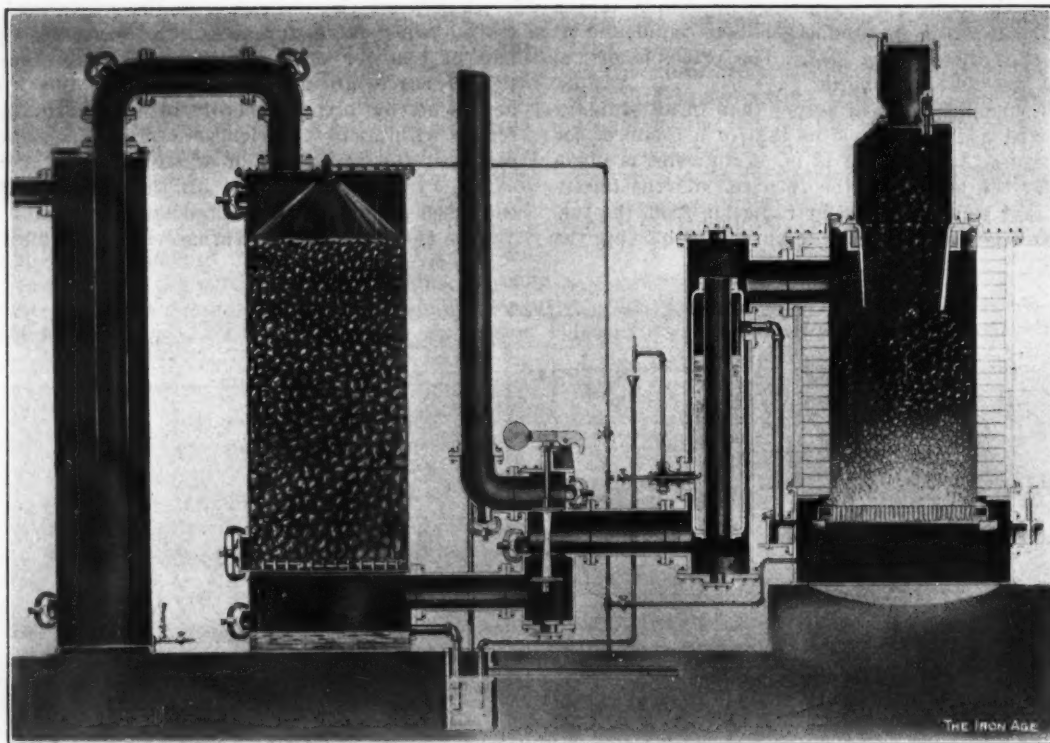


Fig. 1.—Sectional Views of the Parts in a Suction Gas Producer as Built by Fairbanks, Morse & Co., Chicago.

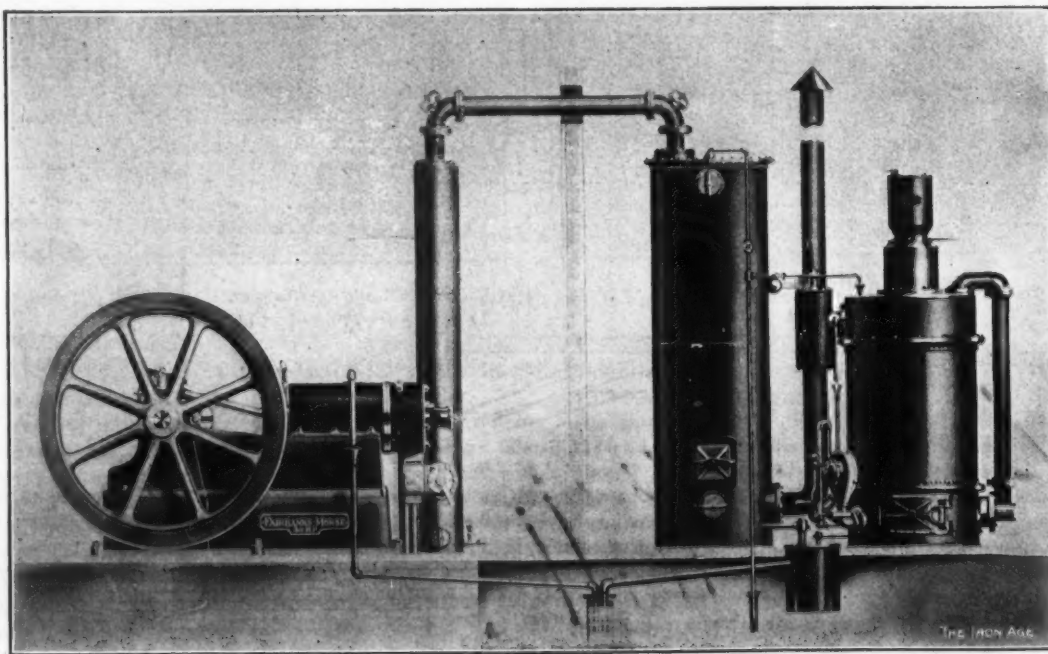


Fig. 2.—The Combination of a Fairbanks-Morse Producer and Horizontal Gas Engine.

realized, but still the economy of a gas engine is sufficiently better than that of a steam engine to permit using more expensive fuel and still compete successfully. Once rich gases were considered necessary for proper working of internal combustion engines, but the Town's gas engine of those days has since been greatly excelled in efficiency by the modern producer gas engine using lean gas.

Recent tests made by the United States Geological Survey proved that a producer gas engine will develop a brake horsepower on less than 1 lb. of coal, which pro-

recovers the most from the heat energy in the coal is attested in the report of the United States Geological Survey on the extensive tests made at the Louisiana Purchase Exposition comparing producer gas engines and steam engines of the same power.

According to this report the steam generated by a boiler was used in a small noncondensing engine of the Corliss type, whose water rate was 26.3 lb. of steam per horsepower-hour, and the engine was belted to an electric generator, the mechanical efficiency of the combination

being estimated at 81 per cent. The coal consumed per electric horsepower-hour was 4.3 lb. If a more economical type of steam engine had been used—for example, one capable of developing 1 hp. with 18 lb. of steam per hour—and the electrical generator had been direct connected to the engine, giving a mechanical efficiency of 90 per cent., then the total dry coal per electrical horsepower-hour would have been reduced to approximately 3 lb. While such results are frequently attained by steam engines operating in large units, it will be conceded that in plants from 200 to 250 hp. they are seldom reached. The tests were averages from a large number of comparative tests while burning various coals under a boiler and in a gas producer. After the gas engine used was improved so that the point of ignition could be adjusted to suit the various gases 0.95 lb. of dry coal were required per electrical horsepower-hour, measured at the switchboard, or, allowing 15 per cent. loss from the engine to the switchboard, a fuel rate of 0.783 lb. of dry coal per brake horsepower-hour. A comparison of expense is further in

with firebrick and fitted with a grate near the bottom. At the top is a hopper mounted on a magazine. After the fire has been started and is properly burning the magazine is filled with coal through the hopper, which is provided with an upper and lower valve, so that coal can be introduced without allowing air to enter. While the hopper is being filled the bottom valve is closed, then the top valve is closed, and opening the bottom valve delivers the coal into the magazine.

An external vaporizer is a part in the delivery pipe from the generator. Its object is to utilize the heat from the gases as they pass from the generator in vaporizing a small amount of water which is constantly supplied to the vaporizer and thence delivered to the generator below the grate. At each suction of the engine atmospheric air with the vapor is drawn through the grates and used in producing the gas. This gas is drawn through a wet scrubber to the engine, first passing through a standpipe permitting only dry gas to go into the engine.

The details and arrangement of the vaporizer have

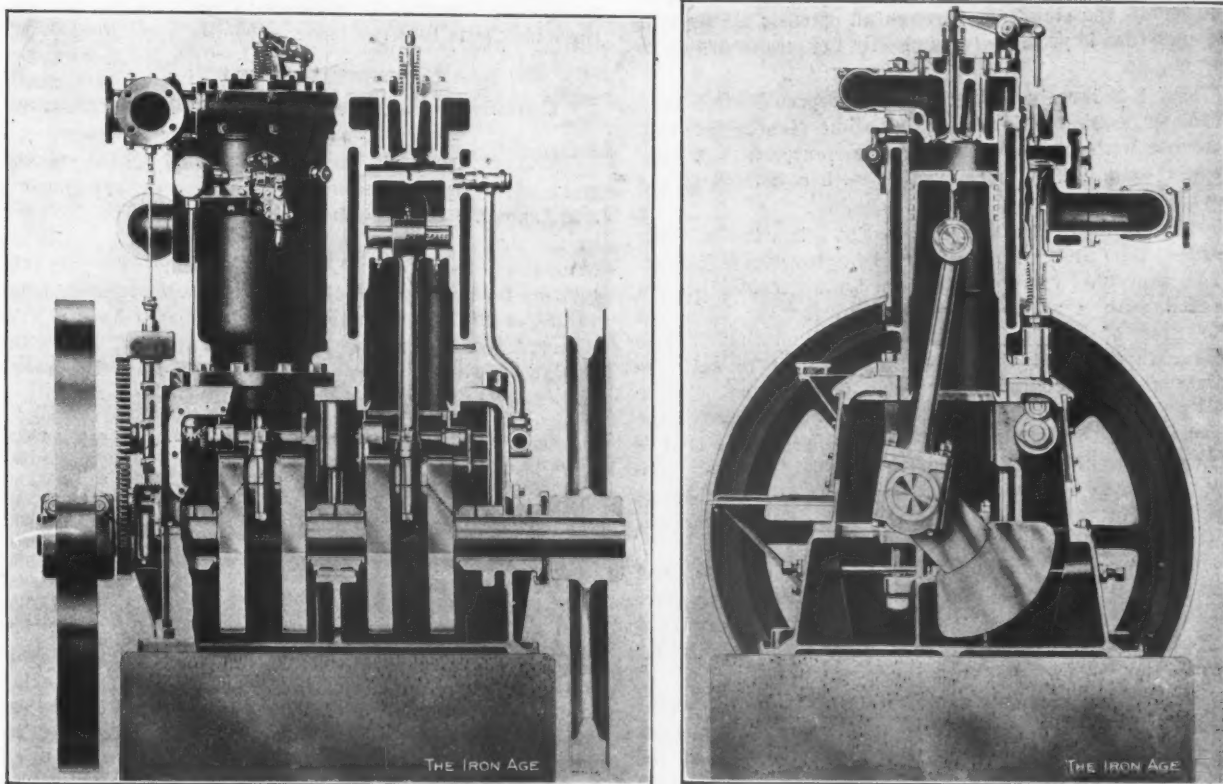


Fig. 3.—Side Elevation Partly in Section and Sectional End Elevation of the Fairbanks-Morse Vertical Two-Cylinder Gas Engine.

favor of a gas producer plant because it requires less than half the labor for attendance necessary for an equivalent boiler plant.

Any one contemplating the installation of a power plant has only to compare the cost of the two fuels such as would be used for the steam boiler and for the suction gas producer and multiply these prices by the fuel consumption in each case to develop a given power; then the difference between the two results will leave no question as to which is the most economical. The average composition of good producer gas is approximately as follows:

	Per cent. by volume.
Carbon monoxide (CO).....	17
Hydrogen (H).....	9
Marsh gas (CH ₄).....	6
Carbon dioxide (CO ₂).....	10
Nitrogen (N).....	57

While the action of producer gas plants is generally understood, it may be expedient to repeat some facts well known in describing the operation of the outfit illustrated herewith, which is built by Fairbanks, Morse & Co., Chicago. Referring to Fig. 1, the apparatus on the right, which is known as the generator, is an iron shell lined

been made such that it is accessible for cleaning and examining without disturbing the producer proper. This is very important where the water used might affect the walls of the vaporizer, making cleaning frequently necessary. By loosening several bolts the entire vaporizer section, which is made of a special cast iron and is provided with radiating ribs, can be removed, inspected and cleaned. A special valve at the left of the vaporizer admits cold water through an annular fitting, which is the hot water overflow. The effect is that of a water heater, raising the temperature of the entering water nearly to the boiling point before it is admitted into the vaporizer.

Seals are provided on the generator and also on the scrubber, so that any momentary pressure of gas in the apparatus from any cause, such as a sudden shutdown, is taken care of at the seals; but in addition to this a special by-pass valve has been designed and is located between the vaporizer and the scrubber. This valve is balanced and is held to its seat by a weight. Any back pressure beyond that which would be taken care of at the seals throws the balanced valve open, and, reversing the weight, holds it locked in that position. The generator is then open to the atmosphere and communication to

the engine cut off. This valve is of the single lever type and can be mounted so that there is no danger of closing the wrong valve, thereby avoiding any possibility of accident or trouble. While the fire is being blown up previous to starting this valve is set in its open position.

The scrubber is a cylindrical shell, fitted with a grate at the bottom, and serves the double purpose of a reservoir and gas cleaner. By the suction action of the engine the gas is drawn through the grate and a body of coke resting upon the grate, the coke forming the filter body, which is kept thoroughly wet by a spray of water admitted at the top. The spray nozzle is another new feature, and is so constructed that it can be cleaned by simply turning a stem, while the apparatus is running, without shutting off or stopping the flow of water. This is very important to the making of uniform gas, as without proper washing good gas is impossible.

To assure a dry gas, free from water, a special form of standpipe or gas reservoir, shown at the extreme left, is used. The gas enters through a pipe from the scrubber extending to within a short distance from the bottom and leaves the standpipe through an opening at the top; the moisture is precipitated and only dry gas is drawn to the engine.

Fig. 1 is largely a diagrammatic representation of a producer equipment, the parts being shown for convenience with their centers in a common plane. A commercial installation in connection with a horizontal gas engine is shown in Fig. 2.

The engine shown in section in Fig. 3 is a two-cylinder vertical type and embodies several improvements, including a simplified valve gear and an igniter mechanism arranged with a variable timing quadrant for adjusting the time of ignition in the cylinder, making it late when starting and thereafter adjusting it to suit the working of the engine under varying conditions. While the adjustment can be regulated to a fine degree, the mechanism accomplishing it is very simple. The cam is feathered to the driving shaft of the ignitor gear in a spiral keyway, so that by shifting it axially the cam is advanced or retarded, and by a clamp on the quadrant lever can be fixed in any desired position.

The governor acts upon the air and the gas, and through a lever the position of the valves as well as their travel can be adjusted while the engine is operating. This is of great advantage, particularly when the quality of the gas varies.

Other improvements are specially designed water jacket, valves and valve cages and improved bearings. A feature is the support of the center bearing of the crank shaft on adjusting wedges, for keeping the shaft in alignment and allowing for the more rapid wear which would naturally take place on the outside bearings. This construction permits easy adjustment without the annoyance of lifting the crank shaft. The division of the base in line with the center of the crank shaft allows raising or separating the base to remove the crank shaft. The liners for the crank shaft bearings are removable by lifting the cap and sliding the liner around the shaft after it has been raised 1-16 in. to free the liner. It can then be replaced with a duplicate, all parts being interchangeable.

An improved form of hammer break ignitor is used, wherein the movable electrode carries only its own weight. The operating trigger is carried on a stud attached to the face flange of the ignitor, and when raised in action by the ignitor cam is suddenly released and falls against a fluted surface on the movable electrode. This causes the arm on the inner end to swing out of contact with the fixed electrode, which is the insulated one, opening the circuit between the two platinum points, when the spark takes place, firing the charge.

Compressed air from a storage reservoir is used to start these vertical engines. The air is pumped into the reservoir by an auxiliary compressor driven from the engine while it is running. During starting one cylinder is temporarily converted into a single acting air engine. The one shown in section in Fig. 3 is for this purpose, and has a fitting on the top at one side connected by a pipe to a mechanically operated valve located on the casing in line

with the cam shaft. By shifting a cam lever the gear shaft is placed in a secondary position, throwing into action the mechanically operated air valve and changing the time of opening of the exhaust valve. When the air is turned on and the engine thrown over the center it starts as an air engine and speed is quickly gained, permitting the left hand cylinder to charge and fire the gas in the regular manner, this cylinder having been undisturbed as an explosion engine. The explosions immediately accelerate the engine speed, and as soon as running speed is approximated the cam shaft is changed to normal position, when both cylinders act as explosion engines, and the governor, by controlling the quantity of fuel, maintains the uniform speed.

Splash lubrication is entirely dispensed with, each bearing being positive oiled through a sight feed. This is true also of the wrist pins, as holes are drilled through the crank shaft and into the pins, so that oil is delivered inside of the connecting rod brasses. The oil, after having performed its functions on the working parts of the engine, falls into the base, is passed through a filter and pumped up into the oil reservoir to again be fed through the sight feeds into the bearings.

Canadian Metal and Kindred Industries.

TORONTO, June 22, 1907.—In addition to the figures given out early in June by the Canadian Census Department showing the growth of the country's manufactures in the first five years of the present century, statistics have since been made public by the same authority exhibiting that growth in detail. In this second bulletin the values of the outputs under each head are shown. The totals of those industries that may be grouped as of particular interest to persons concerned in iron and metal and derived products are as follows:

	1900.	1905.
Smelting, including iron.....	\$7,082,384	\$28,426,328
Foundry and machine products.....	15,292,445	24,013,094
Cars and car works.....	3,954,172	14,430,190
Agricultural implements.....	9,597,389	12,775,748
Car repairs.....	7,546,644	11,442,807
Plumbing and tin-smithing.....	6,553,957	11,406,671
Iron and steel products.....	6,912,457	9,881,385
Electrical apparatus.....	3,032,252	8,996,906
Carriages and wagons.....	6,650,912	8,347,509
Wire.....	1,693,995	3,934,484

The gain in smelting is the largest under any head. Large additions have been made to the smelting capacity in every province that is developing its mineral resources. This is in part to be attributed to the bounties, and in part to advance in the prices of minerals. In the case of lead both these influences are to be counted. In 1903 the lead bounty law came into force, and from a production of 8000 tons the output of the lead smelters has risen to 30,000 tons per annum. At the same time lead has steadily risen in price, and since the close of the fiscal year 1906, no lead bounties have been paid or earned, for the reason that the market price has ruled above the limit under which bounties are due. Since 1900, there has been a material increase in the smelting capacity of the pig iron furnaces, additions having been made in both Nova Scotia and Ontario. As was to be expected from the great development of the country's railroad system, the output of car works has increased almost fourfold. Very notable, too, has been the growth of the domestic manufacture of electrical apparatus and supplies. The visible demand for these has for some time impressed observers, and there must have been a continued large importation in order to eke out the home supply indicated in the census figures. Another product of which the home manufacture has increased substantially, but of which still there are large imports, is wire. Wire remained on the free list until the revision of the tariff, when only galvanized wire of 9, 12 and 13 gauge was left on the free list.

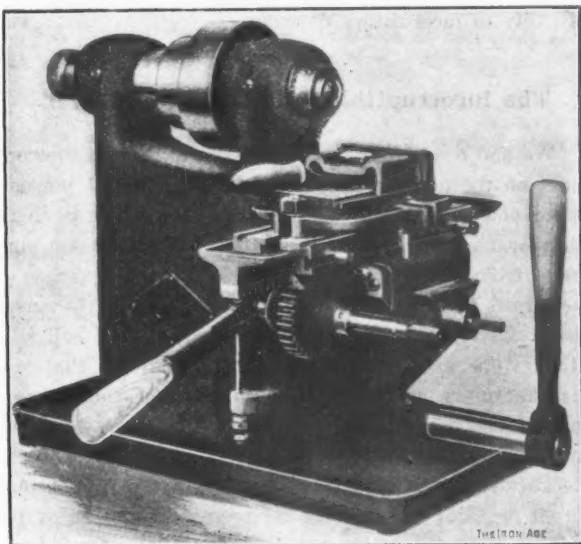
In boilers and engines the value of the output of 1905 shrank from that of 1900, being \$3,473,000 in the later year, as against \$4,626,000 in the other. Ships and ships' repairs likewise showed a decline, the value in 1900 being \$1,900,000, and in 1905, \$1,650,000.

C. A. C. J.

A New Chicago Hand Milling Machine.

Radical changes have been made in the design of the hand milling machine built by the Chicago Machine Tool Company, Chicago, as will be seen from the accompanying illustrations. While the range of work it is intended to handle and the general principles of its mechanism remain the same, there are important improvements in details, resulting among other things in greater convenience in manipulation. The spindle bearings are furnished with oil reservoirs, enabling the machine to run for months without reoiling. A new feature is the use of interchangeable split chucks or taper sockets in the spindle, the removal of the chuck and its sleeve, permitting the substitution of a sleeve with a No. 9 Brown & Sharpe taper hole. Formerly a machine of this type was provided with either a split chuck or a taper hole, but not with both.

The conveniences for feeding the work have been greatly improved. The lever handle at the side gives longitudinal feed for ordinary work, and the squared shaft for a crank at the front, operating the same rack pinion, gives feed the full length of the rack. The lever spindle at the front raises and lowers the knee, and the squared shaft above it controls the cross feed. A common practice is to use the knee lever to start the cutter into the work and then feed with the longitudinal feed lever, using both hands. The knee is inclosed. The machine is provided with a removable quick acting vise,



An Improved Hand Miller Built by the Chicago Machine Tool Company.

stops for limiting the longitudinal movement of the table, and micrometer adjustment of the cross feed. The tool is furnished with a countershaft of new design, with self-oiling boxes and loose pulley.

Comparative Costs of Cooking by Various Means..

By cooking a meat for one hour, by each of five methods, comparisons have been made of the costs. The table shows that the cost by electricity is double that by gas, and gives the details:

Method of cooking.	Consumption.	Unit cost of fuel.	Total cost. Cents.
Electricity	1.032 kw.-hr.	4 cents per kw.-hr.	4.128
Coal	10.5 lb.	\$7 per ton net.	3.675
Gas	20 cu. ft.	\$1 per 1,000 ft.	2.0
Gasoline	0.0832 gal.	15 cents per gallon	1.248
Kerosene	0.078 gal.	14 cents per gallon	1.092

At the rate usually paid for electricity, the cost of this method of cooking would be much higher; but the prices given for gasoline and kerosene are also low in many localities. It is usually considered that cooking by coal is cheaper than by gas. The advantages of electric cooking from sanitary and labor saving standpoints are that there is no smoke, flame or soot, and no ashes or dust.

When the apparatus is in use there is little rise in temperature of the surrounding air, no vitiation of the atmosphere, and practically no radiation of heat into the room, a great advantage in summer. A uniform heat may be maintained without difficulty, and there is no danger of fire or an explosion.

A Photographic Drop Forging Record.

The Billings & Spencer Company, Hartford, Conn., preserves a photographic record of every form of drop forging it manufactures, and finds that this constitutes

J. P. Blacksmith Tool Co No. 9 4601

Forging #3 Tap Holder	9/07 per lb. .02
Stock 10 carbon Size 2x1 Lgh 13 1/2 Wt 7 1/4	Cost .155
Wt. fin. 54.103 Piece price .06	Av. 100 Qty 1000 By James
Shop exp. .12 Cost .335	
Price .50	
—DIES—	
Finish 2	Trim 107 Patches 100
Die Order's 3/4607	
First cost of die 128.00	Location of die 7/30 Location of sample 3/26
—REMARKS—	
Price based on 1000 Cots 6/12/07	

Index Card for Drop Forgings, Used by the Billings & Spencer Company, Hartford, Conn.

a valuable part of the general office and manufacturing system. Each different forging is sent to the drafting room, where a special contrivance has been arranged for photographing the part. A camera is fixed on a slide, with lens pointed downward. Beneath is a large rectangle of plate glass, suspended away from the floor, on which the object is placed and where it is rid of sharp shadows, as light approaches it from all directions. A negative is made and from it a blue print. All forgings are photographed with a scale, that dimensions may be had at a glance. The blue print is pasted on the back of a card, the face of which is shown in the illustration. The card contains detailed information concerning the piece, including its material, weight, general dimensions, labor and total costs, and selling price; details of operations to which the piece is subjected, record of the dies (which for the part illustrated comprise two finishing dies, one hot trimming die and one steel punch), cost of dies, and the location of dies and sample.

The cards are indexed in a filing cabinet, in conjunction with a record book, so that it is a matter of a few seconds only to refer to any desired forging.

The system has proved to be invaluable in making estimates of new work, and it is in this connection that the photographic record is of much use. It frequently happens that orders are received for forgings which are in many respects duplicates of work done in the past for other customers. Occasionally orders are almost exact repetitions. Very many times the record, with the photograph, assists the company in figuring prices on new business. The photograph answers as well as a sample of previous similar work.

Alabama is steadily increasing the home consumption of its pig iron output. The estimate is published that 50 per cent. of its this year's make will be used by the steel works, pipe foundries and general foundries of the State, and that next year 60 per cent. will be thus used. This means that more finished products than pig iron will hereafter be marketed by Alabama manufacturers.

L. Vogelstein & Co., 100 Broadway, New York, furnish the following figures of German consumption of foreign copper for the months of January to April, 1907: Imports, 39,059 tons; exports, 2834 tons; consumption, 36,225 tons, against 38,804 tons during the same period in 1906. Of this amount 31,103 tons were imported from the United States.

cited individuals, but through a report made by the Parliamentary Committee on Public Accounts. This committee had been investigating Admiralty contracts for the construction of vessels for the British navy. The committee, among other things, found that the builders of the battleship King Edward VII secretly patched up a defectively cast rudder which the government was obliged to replace. The builders gathered together a few of their employees on a certain Sunday, and by electric welding concealed a huge fault in the rudder. The report of the committee says: "We hope it will not again be our duty to investigate a case where a British firm for commercial advantage will callously hazard the lives of hundreds of its fellow countrymen."

It may be possible that American manufacturers have occasionally furnished steel rails which were not equal to the duty of carrying traffic without fault for the entire time which it was expected they would be able to serve. Nevertheless, no instance has yet been disclosed in which an American rail of defective condition when rolled was subsequently treated by the manufacturer so as to be able to cover defects or blemishes and thus be put in condition to pass inspection. We will not go so far as our British contemporaries in endeavoring to prove that this finding of the Parliamentary Committee on Public Accounts sounds the death knell of British manufactures. The citation of this case, however, is sufficient to show that Great Britain has no monopoly of honor in manufacturing.

The Police Power of the State and Labor Legislation.

There has just been rendered a unanimous decision by the Court of Appeals of the State of New York in a case which possesses a great deal of significance since it shows the attitude of the higher courts toward the prevailing practice in State legislatures to abuse the police power in behalf of labor schemes.

Section 77 of the Labor Law of the State of New York reads that "no minor under the age of 18 years and no female shall be employed, permitted or suffered to work in any factory in this State before 6 o'clock in the morning or after 9 o'clock in the evening, or for more than 10 hours in any one day, except to make a shorter work day on the last day of the week; or for more than 60 hours in any one week; or more hours in any one week than will make an average of 10 hours per day for the whole number of days so worked."

In order to test the constitutionality of this law, David L. Williams, the treasurer of the Williams Printing Company, of New York, was brought before a trial court. After he had been found guilty of employing a woman over 21 years of age at work in the bindery of the company at 10.20 o'clock in the evening, the trial court granted his motion in arrest of judgment and discharged him, holding that the legislative enactment was unconstitutional. Subsequently the Appellate Division, by a divided court, affirmed the order of the trial court. The People brought the case before the Court of Appeals, the attorney for the respondent being Henry B. Corey, of Douglass & Minton, New York.

While the Appellate Division based its decision upon the sole ground that there was no evidence to show that it was more injurious to women to work at night than during the day, the higher court went very much deeper into the underlying principles. Judge Gray, who wrote the decision, took the ground that "under our laws men and women now stand alike in their constitutional rights,

and there is no warrant for making any discrimination between them with respect to the liberty of person or of contract." He adds that the enactment "attempts to take away the right of a woman to labor before 6 o'clock in the morning and after 9 o'clock in the evening, without any reference to other considerations."

But the decision lays down much broader principles so far as the police powers of the State may be allowed to infringe the constitutional rights of individuals. Judge Gray says: "The courts have gone very far in upholding legislative enactments framed clearly for the welfare, comfort and health of the community, and that a wide range in the exercise of the police power of the State should be conceded I do not deny, but when it is sought under the guise of a labor law arbitrarily as here, to prevent an adult female citizen from working at any time of the day that suits her, I think it is time to call a halt. It arbitrarily deprives citizens of their right to contract with each other. The tendency of legislatures, in the form of regulatory measures, to interfere with the lawful pursuits of citizens is becoming a marked one in this country, and it behooves the courts firmly and fearlessly to interpose the barriers of their judgments when invoked to protect against legislative acts plainly transcending the powers conferred by the Constitution upon the legislative body."

It is interesting to observe that Judge Gray refers in his decision to the case of *Lochner* against the State of New York, in which the United States Supreme Court overruled the New York Court of Appeals. In that case the United States Supreme Court declared unconstitutional the law under which an attempt was made to fix a 10-hr. day for bakers and confectioners. In its decision the United States Supreme Court held as follows: "Statutes of the nature of the one under review, limiting the hours in which grown and intelligent men may labor to earn a living, are mere meddlesome interferences with the rights of the individual."

It is evident, therefore, that our highest judiciary is checking the disposition of legislators to infringe the personal rights of citizens under the pretext that it is unhealthful or undesirable that they work under conditions which may be satisfactory to them. It may be noted, incidentally, that the deputy factory inspector in his testimony in the Williams case stated that "it is the best factory of the kind in New York City."

Paternalism has been running wild in this country for some time, and has been used as a cloak for a great deal of viciously restrictive measures. It is well that good sense should put a check even upon honest sentimentality, and it is above all important that the fundamental rights of the individual to contract for his labor be recognized and respected.

Striking at the Misleading Prospectus.

New York and Connecticut have recently legislated against the issue of circulars containing misleading statements designed to beguile investors. The making or publication of such statements is to be deemed a misdemeanor, and any person found guilty of so doing is subject to quite severe penalties. The practice of issuing extravagantly written prospectuses, holding out glittering inducements to purchasers of stock in proposed mining and manufacturing enterprises, has gone to such lengths that promoters appear to feel themselves free to promise almost anything. Of late every new mining company either owns or is absolutely certain that it will develop a bonanza, while the new manufacturing company that

cannot assure the buyer of a few shares of stock that he will get a substantial income from early dividends is, indeed, a rarity. It might be supposed that the manner in which these inducements are set forth would in itself warn all sensible persons that a trap was being prepared for the unwary owner of a little loose money. But it is surprising how many persons of apparently good business sense are looking for opportunities to invest money that will return them far more than the savings bank rate of dividend or interest. With this in view they may pass the first half dozen wildcat schemes coming under their observation, but will be caught by a later one, even worse than any of its predecessors. While it is certainly not the province of any government to go to extremes in endeavoring to prevent its people from making fools of themselves, it seems wrong, on the other hand, to permit such swindling schemes as these to flourish unchecked.

The Sheet and Tin Plate Scales Arranged.

At a conference held in Pittsburgh last week between committees of the American Sheet & Tin Plate Company and the Amalgamated Association, the wage scales were arranged in those of the company's sheet and tin plate mills which sign the Amalgamated scales. The scale presented by the workmen called for a number of advances, but it was pointed out by the committee of the American Sheet & Tin Plate Company that owing to the higher prices of raw materials, notably pig tin, it was absolutely impossible to pay any higher wages for the coming year than are now in force. The fact was also referred to that the tin plate employees have received three advances of 2 per cent. each this year on the sliding scale basis, while sheet mill employees have received two advances of 2 per cent. each. The Amalgamated Association then withdrew its demands for an advance and the scale now in force, which expires on June 30, was renewed for the year commencing July 1.

In the footnotes in the sheet mill scales No. 23 was changed to read as follows:

That payment of all regular tonnage and day hands called for in the scale be paid by the company, and tonnage men shall be furnished with pay statements prior to pay day.

A new footnote, No. 25, was added, reading as follows:

That sheet mill crews shall not remain in the mill more than three hours without working.

Two new footnotes, Nos. 23 and 24, were added in the tin plate scale as follows:

23. That shearmen's wages be advanced 25 per cent. on single iron or packs finished in two sheets to the pack.

24. That 25 per cent. shall be paid to shearmen on all orders that are cut once on one shears, and then taken to another shears to be finished.

The settlement above referred to removes any necessity for a conference with the independent sheet and tin plate mills, as they will sign the scale as thus arranged.

The Steel Foundry Company, Cincinnati, in Receiver's Hands.—William Lodge, J. F. Ellison, J. C. Hobart and Franklin Alter of the Steel Foundry Company, located at Chester Park, Ohio, applied to the Insolvency Court at Cincinnati on Tuesday, June 25, to have a receiver appointed to take charge of the affairs of the company. S. W. Hume was appointed by the court and gave the necessary bond. The reason for this action is continued labor troubles, which have curtailed production and lessened receipts to such an extent that, after a conference on Tuesday, the above action was decided upon. The statement issued by Mr. Lodge in connection with the petition is in substance, that owing to a strike at the foundry the company's source of income was stopped and the stockholders decided that, though there was no question as to the solvency of the concern, it would be better to have the affairs of the company administered by a receiver, so that no injustice would be done stockholders or creditors. The Steel Foundry Company is capitalized at \$200,000, fully subscribed by the stockholders. The debts are estimated to be about \$75,000.

A dissolution and sale of the property are also asked for in the petition.

The Susquehanna Iron Company.

The Susquehanna Iron Company is the name which has been selected for the new company to succeed the Susquehanna Iron & Steel Company, whose extensive properties at Columbia, Pa., and vicinity, were recently disposed of at receiver's sale. Application for a charter under the laws of Pennsylvania has been made by Michael Blake, 149 Broadway, New York; P. B. Shaw, Williamsport, Pa., and W. W. Griest, Lancaster, Pa., in whose interest the properties were purchased. Mr. Shaw is a resident of Williamsport, Pa., and is a director of a number of electric railroad, gas and electric light companies in Williamsport, Harrisburg, Columbia, York and Coatesville. He is also principal owner of the new Pennsylvania Building, which will be one of the largest and finest office buildings in Philadelphia, and a director of several banks and trust companies. He is, therefore, of high standing in business circles in eastern Pennsylvania. Mr. Griest is president of the Conestoga Traction Company, Lancaster, Pa., owning and operating 12 railroads in various towns and cities east of Harrisburg, and is also a director in numerous electric light and gas companies, banks and trust companies. He also occupies a position of financial prominence in his section. Mr. Blake is no stranger to the iron trade in the vicinity of New York, but is regarded as a leading authority on the scrap iron situation, being the principal owner in the firm of John Leonard & Co., which probably stands first in its line of business in the East. He is also vice-president of the Manhattan Rolling Mill Company, New York, vice-president of the International Iron & Metal Company, Newark, N. J., and a director and treasurer of the Wilmington Iron Company, Wilmington, Del.

At a conference recently held by the incorporators, Charles Brock was named as the president and general manager of the new company, and Mr. Blake as the vice-president and treasurer. Mr. Brock is in the prime of life, and has been in the iron business since he was 15 years old, when he was employed by his father, who was then manager of a blast furnace at Cold Spring, N. Y. He was connected with the manufacture of pig iron until about 20 years ago, when he removed to Boonton, N. J., having purchased an interest in the Boonton Iron & Steel Company. He now controls over 75 per cent. of the capital stock of the company. Under his management the company has been remarkably successful, its plant now being one of the best in its line in the East. Mr. Brock has been president of the company over eight years, and is now also a director of the Boonton National Bank, and president and principal owner of the Boonton Rubber Works. With Mr. Brock's practical knowledge of the manufacturing end of the iron business, Mr. Blake's expert connection with raw materials, and the association with them of men of large means, the combination of new owners and management in the Susquehanna properties is looked upon as a very strong one. Mr. Brock is now in active charge of the affairs of the new company, all departments of which are in full blast except the furnaces. The selection of superintendents and heads of departments is in the hands of Mr. Brock.

It is the intention of the incorporators to have a working capital of \$500,000, which is considered ample for the scope of the company's manufacturing operations.

On the night turn of Thursday, June 13, the 23-28-in. mill of the Pencoyd Iron Works, Pencoyd, Philadelphia, charged and rolled 497 gross tons of open hearth steel into good 15-in. I-beams, with the exception of two cobbles, weighing 8000 lb. The product of the turn was 463½ gross tons, beating the best previous record of the mill.

The Delaware River Iron Shipbuilding Company, Chester, Pa., launched successfully June 11 the passenger and freight steamship City of Savannah, building for the Ocean Steamship Company.

Canadian Manufacturing Projects.

Wire Works for Fort William.

TORONTO, June 22, 1907.—On July 10 the ratepayers of Fort William will vote on a by-law embodying agreements between the municipal corporation and the Imperial Steel & Wire Company. Under the first of these agreements the company engages to build works in Fort William for the manufacture of plain galvanized, annealed, barbed and other fencing wire, staples, and other wire products. These works are to be begun within 40 days after the final reading of the by-law, and are to be constructed with reasonable dispatch. By the first of next June they are to be ready to manufacture 100 tons of drawn wire daily. The plant is to be kept in operation 25 years, and is to keep employed during the whole of that period not fewer than 200 hands. The cost of the machinery, buildings, and dock is to be not less than \$200,000. On the city's part it is agreed to convey to the company a free site of 10 acres, fronting on the Kaministiquia River. Further, the city undertakes to guarantee the principal and interest of the company's first preferential bond issue of \$100,000. The bonds are to mature in 25 years from the date of issue and are to bear interest at the rate of 5 per cent. per annum. The property of the company is to be rated for taxation at an assessment of \$50,000, which assessment is to remain unchanged for ten years. Unless the company consents, the bonds are not to be sold for less than par.

A Structural Steel Project.

It is announced that a plant for the manufacture of structural steel will be established in Walkerville. Two men formerly connected with the Canadian Bridge Company are mentioned as the promoters of the undertaking. Their names are Henry Drake and Herman Schwein.

Traction Engines at Port Arthur.

Some time ago the city of Port Arthur entered into an agreement with the Meisel Company, whereunder the company was to establish in the city works for the manufacture of tools and machinery, the municipality guaranteeing bonds for 25 per cent. of the amount expended on the works. For some reason the company found itself unable to carry out its part of the contract, and other parties came forward to take its place. The former agreement was cancelled and a new one has just been concluded with the successors of the Meisel Company. This will have to be approved by the ratepayers, as was the agreement with the Meisel Company. The name of the new corporation is the Port Arthur Engine & Thresher Company. It is undertaken by the company, that immediately after the ratepayers' ratification, it will construct a plant for the manufacture of traction engines, threshers, heavy farm machinery and other machinery within the city limits. Its works are to be ready for operation at the end of the present year. It is to expend \$50,000 on these. A site of 10 acres in a designated location is to be sold by the city to the company for \$200 an acre. Also a portion of the city's water lot is to be leased to the company at the nominal rental of \$1 a year. But the most important concession is the city's practically free supply of hydro-electric power at the company's dynamos. A continuous 24-hr. service of 130 hp. is to be provided by the city at the nominal rate of \$1 a year. On the city's street railroad system there is to be a special service to and from the company's works at the hours of the assembling and dispersing of the hands. For this purpose the city must build a bridge across Current River, grade a road to the company's lands and lay it with street rails. For 10 years, which is the period covered by all its privileges, the company is to be exempt from all taxes, except those for school and local improvement purposes.

C. A. C. J.

General William J. Palmer has given the Engineering School of Colorado College, Colorado Springs, the sum of \$12,000, to be expended immediately upon additional equipment of the engineering laboratories for senior work.

New Drawback Regulations.

WASHINGTON, D. C., June 25, 1907.—Several important drawback regulations in favor of prominent manufacturers have been issued by the Customs Division of the Treasury Department covering exportations of power transmission machinery, boiler grates and general castings, stoves and furnaces, and mowing, reaping, and harvesting machinery.

The National Foundry Mfg. & Supply Company, Williamsport, Pa., applied for the allowance of drawback of duty paid on imported pig iron used in the manufacture of power transmission machinery, boiler grates and general castings intended for export. The regulations issued provide that in liquidation the quantity of imported pig iron which may be taken as the basis for the allowance of drawback may equal the quantity declared in the drawback entry after official verification of exported quantities, provided that the same shall not exceed the quantity of imported pig iron contained therein, with an addition of 5 per cent. of the weight thereof to compensate for the loss in the manufacture.

The Danville Stove & Mfg. Company, Danville, Pa., applied for drawback on imported pig iron used in the manufacture of stoves and furnaces intended for exportation. The requirements for entry and liquidation are substantially the same as those covering power transmission machinery, &c., above outlined.

The Walter A. Wood Mowing & Reaping Machinery Company, Hoosick Falls, N. Y., applied for drawback on imported pig iron used in the manufacture of mowing, reaping and harvesting machinery. The requirements as to entry and liquidation are similar to those above quoted, but, in addition, it is provided that supplemental sworn schedules of the machinery and the weight of the castings may be filed with the collector whenever any change is made of the weights of the castings differing from those contained in the schedules now on file "or in the event of making any other kind or name of farm machinery."

W. L. C.

New Furnaces at Cleveland and Detroit.

The Cleveland Furnace Company has decided to build a new blast furnace adjoining the company's present furnace, in Cleveland, Ohio. The furnace will be 22 x 85 ft., and will have a daily capacity of from 400 to 500 tons, being somewhat larger than the present furnace. It will be used for the production of basic, Bessemer and malleable iron, while the old furnace will be used for foundry iron as at present. Contracts are now under way and work will be started soon. It is expected that the new furnace will be ready for blast in about a year. The furnace company is building a concrete dock along the river adjoining its property. It is expected that when dredging, now under way, is completed next spring, 7000-ton ore boats can tie up to the company's docks. D. T. Croxton is manager of the company.

The directors of the Detroit Furnace Company, Detroit, Mich., at a meeting held last week decided to build a new furnace which will be a duplicate of its present stack, which is located at Zug Island, Detroit River. The stack will be 17½ x 78 ft., and will have a daily capacity of about 300 tons. Plans will be prepared at once and it is probable that work on the new furnace will be started during the summer. D. R. Hanna is president of the Detroit Furnace Company, and the principal stockholders are interested in M. A. Hanna & Co., Cleveland.

The recently organized Manufacturers' Club, composed of leading manufacturers in the east end of Cleveland, Ohio, held a formal opening of its club house June 20. The club, which was formed about two months ago, has a membership of over 80, and has enough new applications to bring the number up to about 100. The club house has already become a popular place for members to gather for luncheon and for an hour of pleasant social intercourse at noon time.

Bids for Battleships and Armor.

WASHINGTON, D. C., June 25, 1907.—The Secretary of the Navy on the 20th inst. opened bids for the two battleships Nos. 28 and 29, of 20,000 tons each, known as the Dreadnought class. Bids were submitted by four of the leading Atlantic coast shipbuilders, all of the proposals being much under the limit of cost set by Congress, which was \$6,000,000 each, exclusive of armor and armament, the total estimated cost completely equipped being \$10,000,000. A large number of prominent shipbuilders, sub-contractors, naval officers and others interested in marine architecture were present, and general surprise was expressed at the low bids submitted in view of the present condition of the labor and material markets.

The Lowest Bids.

The Newport News Shipbuilding & Dry Dock Company, Newport News, Va., which submitted seven bids, was far below all competitors and will undoubtedly be awarded a contract for one of the ships. The minimum bid of this company was below the price at which the contract for the 16,000-ton battleship Minnesota was awarded and \$3000 less than the price at which this company built the battleship Louisiana, which was constructed in competition with the New York navy yard, at which her sister ship, the Connecticut, was built. As the law forbids the granting of a contract for more than one of these vessels to a single shipyard, it is expected that the second vessel will be awarded to the Fore River Shipbuilding Company, Quincy, Mass.

A feature of the opening which was of special interest to the officials of the Navy Department was a series of confidential bids submitted by the naval constructors of the New York and Mare Island navy yards, compiled by direction of the Secretary of the Navy for comparison with the bids of the private yards. While the figures were not made public it is known that the lowest estimate submitted was considerably above the highest proposal of any of the competing private shipyards.

The bids were submitted upon a somewhat complicated schedule under three classes, as follows:

Class 1. Hull and machinery in accordance with plans and specifications provided by the Secretary of the Navy.

Class 2. Hull only in accordance with drawings, plans and specifications provided by the Secretary of the Navy, or hull and general equipment exclusive of machinery but including the fitting and securing of armor, &c.

Class 3. Hull and equipment in general accordance with the plans and specifications provided by the Secretary of the Navy but with machinery in accordance with the bidder's design.

Opportunities were afforded under class 3 to submit bids to supply and install separate cruising turbines. Bidders were also invited to submit bids for the machinery of the two battleships separately under class 4, but this was not availed of by any of those submitting proposals. The official schedule of the bids as opened is as follows:

Fore River Shipbuilding Company, Quincy, Mass.

Class 1. One ship within 36 months from date of contract, to be delivered at Boston, Mass., \$4,480,000.

Class 3. One ship to be completed within 34½ months, to be delivered at Boston, Mass., \$4,377,000. This does not include cruising turbines.

William Cramp & Sons Ship and Engine Building Company, Philadelphia, Pa.

Class 1. One vessel within 36 months from date of contract, to be delivered at Philadelphia, \$5,100,000.

Class 3. One vessel within 36 months from date of contract, to be delivered at Philadelphia, with turbines of standard Parsons type, \$5,050,000. Does not include cruising turbines.

Class 3. One vessel within 36 months from date of contract, to be delivered at Philadelphia, Pa., with turbines of Parsons No. 1A type, \$5,030,000. Does not include cruising turbines.

Newport News Shipbuilding & Dry Dock Company, Newport News, Va.

Class 1. One vessel within 36 months from date of contract, to be delivered at Newport News, \$3,987,000.

Class 3. One vessel within 36 months, to be delivered at Newport News, with Parsons turbines, arrangement No. 5, \$4,050,000. Does not include separate cruising turbines.

Class 3. One vessel within 36 months, to be delivered at Newport News, with Parsons turbines, arrangement No. 7, and Thornycroft boilers, \$4,050,000. Includes cruising turbines.

Class 3. One vessel within 36 months, to be delivered at Newport News, with Parsons turbines, arrangement No. 1, \$4,090,000. Does not include separate cruising turbines.

Class 3. One vessel within 36 months, to be delivered at

Newport News, with Parsons turbines, arrangement No. 6, and Thornycroft boilers, \$4,100,000. Includes cruising turbines.

Class 3. One vessel within 36 months, to be delivered at Newport News, with Parsons turbines, arrangement No. 3, \$4,100,000.

Class 3. One vessel within 36 months, with Parsons turbines, arrangement No. 2, \$4,120,000. Includes cruising turbines.

New York Shipbuilding Company, Camden, N. J.

Class 1. One vessel within 36 months, to be delivered at Camden, N. J., \$4,545,000.

Class 3. One vessel within 36 months, to be delivered at Camden, N. J., not to exceed 20,500 tons displacement, \$4,600,000.

Class 3. One vessel within 36 months, to be delivered at Camden, N. J., not more than 20,000 tons displacement, \$4,530,000.

Characteristics of Vessels.

According to the memorandum presented to the Secretary of the Navy by the Naval Board on Designs, the two battleships, which are to be of 20,000 tons each, will carry as heavy armor and as powerful armament as any known vessels; will have a speed of approximately 21 knots, which is believed to be the highest practicable for a vessel of this type and class; will have the highest practicable radius of action with a total coal bunker capacity of about 2300 tons. The vessels will have a length on the load water line of about 510 ft., and an extreme breadth of 85 ft., 2½ in.

The main battery will include 10 12 in. breech-loading rifles, and the secondary battery will embrace 14 5-in. rapid fire guns, four 3-pounder saluting guns, four 1-pounder semi-automatic guns, two 3-in. field pieces, two machine guns, caliber 0.30, and two submerged torpedo tubes.

The arrangement of the main battery guns is to be such as to permit a broadside fire 25 per cent. greater than that of the broadside fire of any battleship built, or so far as known under construction. The average elevation of the axis of these guns is expected to be greater than that of any known battleship, thus affording a distinct advantage in long range firing under all conditions of weather. The arrangement of the interior will be such as to give the maximum degree of protection to all vital portions of the ship by means of unusually effective compartmental subdivisions. The actual total weight of hull and armor in the proposed designs for the ships is approximately 3000 tons greater than in the largest battleship so far built.

Bids for Armor.

The Secretary of the Navy also opened bids for the armor designed for the protection of the two great battleships. The Carnegie and Bethlehem companies submitted almost identical bids, ranging from \$400 to \$420 per ton, while the Midvale Steel Company reclassified the armor according to the mechanical difficulties to be encountered in its manufacture and submitted bids thereon, which are believed to be somewhat lower than their competitors', but very careful calculations will require to be made before accurate comparison is possible. The bids were as follows:

Carnegie Steel Company.—Class A, 7956 tons, \$420 per ton; class B, 952 tons, and class C, 392 tons, \$400 per ton; class D, no bid; deliveries to begin within six months and continue at the rate of 600 tons per month.

Bethlehem Steel Company.—Class A, \$420 per ton; class B and class C, \$400 per ton; class D, 76 tons, \$400 per ton; deliveries to begin on or before December 20, 1907, and to continue at the rate of 600 tons per month.

Midvale Steel Company.—Group 1 (part of classes A and B), \$410 per ton; group 2 (part of classes A and B), \$428 per ton; group 3 (part of class A), \$550 per ton; group 4 (class C), \$410 per ton; group 5 (class D), \$410 per ton, deliveries to begin on or before December 20, 1907, and to continue at the rate of 600 tons per month.

W. L. C.

The Seneca Iron & Steel Company has taken an enlarged suite of offices on the third floor of the Erie County Bank Building, Buffalo, N. Y. The company expects to have its new plant, which adjoins that of the Lackawanna Steel Company, at South Buffalo, ready for operation early in August. The main building, or sheet mill proper, is well along toward completion and the galvanizing house will be finished about August 1.

Customs Decisions.

Toothed Grinders.

It has been decided by the Board of United States General Appraisers that toothed grinders made of iron are not plates within the meaning of the word as used in the tariff act. The case came before the tribunal in the form of a protest from Thomas Prosser & Son, New York, who objected to the assessment of 45 per cent. under the provision for manufactures of iron. The classification claimed by the importers calls for a duty of only 8-10 of 1 cent per pound. The grinders are ring shaped, thinner at the inner edge than at the outer, and from this beveled surface project a large number of teeth arranged in rows. It appeared from the testimony that the grinders are to form part of grinding mills, being mounted in pairs on a revolving shaft in such a manner that the teeth of one engage the teeth of its neighbor. Some time ago the same firm imported grinders similar to those before the board last week, but at that time the claim was made that the articles were castings. That contention was overruled and the imposition of the 45 per cent. rate affirmed. It was insisted by the importers at the recent hearing that the grinders should be returned for duty as plates. This new contention was based strictly on the dictionary meaning of words and not on commercial designation. The board's decision states no other testimony beyond the dictionary definitions was given and that the importers failed wholly to establish their contention. The protest was therefore overruled.

Automatic Pistols.

The Board of General Appraisers has decided that so-called automatic pistols are not revolvers in the sense contemplated by the tariff. This is the first time that the question of classifications of this line of goods has been before the reviewing tribunal. The collector assessed the articles at the rate of 45 per cent. under the provision in the law for manufactures of metal. William Read & Sons, the importers, maintained that the pistols should be allowed to enter as revolvers, with a duty of 75 cents each and 25 per cent. ad valorem. General Appraiser Fischer, who writes the decision for the tribunal, expresses doubt as to the correctness of the classification returned by the collector, but is obliged to overrule the protest because the proper claim is not made. He says: "The revolving pistol for which provision is made in paragraph 158 of the tariff is a pistol with a revolvable chambered cylinder or revolvable group of barrels. The article before us has no revolving cylinder, cannot be said to be what is commercially known as a revolver, and from the testimony and the sample offered in evidence we find that it is not classifiable as such. We are, however, inclined to question the correctness of the collector's decision that automatic pistols are classifiable as manufactures of metal, at 45 per cent. ad valorem. This board has held that horse pistols and pistols of antique style and shape were properly dutiable as sidearms under paragraph 154 of the tariff. There is no claim in the protest before us that the pistols should have been returned under paragraph 154 as sidearms, nor have they offered evidence that these automatic pistols belong to or are in the nature of that class of weapons. This being the case, we are not required to decide such issue."

Boiler Explosions Not Caused by Green Men.

In his annual report of the operations of the Factory Inspection Department of Pennsylvania in 1906 Chief Inspector Delaney, Harrisburg, Pa., calls attention to the better results obtained in boiler inspection. There were 100 prosecutions of factory owners, chiefly for employment of children and for failure to guard machinery. Compulsory equipment of elevators with safety devices is urged. Regarding boilers, the report says in part:

Section 19 of the act of May 2, 1905, which gives to this department a better and more stringent supervision over steam boilers, has proved to be of great benefit. . . . It must not be assumed, however, that one or a dozen inspections of a boiler can insure safety. Wilful negli-

gence on the part of the person in charge of a boiler, or, what is fully as dangerous and reprehensible, the demand of that person's services by the employer to a part of the establishment remote from the boiler, will, in the future as in the past, be productive of boiler explosions from the low stage of water or from an overpressure of steam. The one boiler explosion reported was clearly the result of neglect on the part of the person in charge, the boiler having been inspected twice within the immediate preceding 12 months and found to be in good condition.

It is claimed that for better security of persons and property no person should be placed in charge of a boiler or engine until he shall have first passed an examination before a regularly constituted board of examiners. This seems plausible enough, but as a cold matter of fact the men who "blow up" boilers are not green hands in the business of managing boilers and engines, but on the contrary are seasoned veterans.

This department has no jurisdiction over railroad companies in the matter of the inspection of their road boilers and engines. It can be claimed, however, that these companies are very exacting in inspecting their locomotives. And yet, through the negligence of firemen and engineers long in the service, men who rashly take chances on low water and the safety valve, the record of boiler explosions on railroads is far worse than that of factories and shops wherein unskilled firemen and engineers, as alleged, are employed.

New Buildings at Rensselaer Polytechnic Institute.

On commencement day of the Rensselaer Polytechnic Institute, Troy, N. Y., the new main building, Carnegie Hall, the gift of Andrew Carnegie, and the Dr. William Weighton Walker chemical laboratory, the gift of graduates and friends of the institute, were dedicated. President Palmer C. Ricketts announced that through the gift of \$1,000,000 from Mrs. Russell Sage two new courses in engineering will immediately be established; one leading to the degree of mechanical, the other to the degree of electrical engineer. Of the gift, \$700,000 is to be invested and the income used for maintenance. The following committee of graduates, which is significant of the success of Rensselaer graduates, has been named to formally send thanks to Mrs. Sage:

Theodore N. Ely, Chief of Motive Power of the Pennsylvania Railroad; William B. Ridgely, Comptroller of the Currency; Edward C. Carter, Chief Engineer of the Chicago North-Western; William H. Courtenay, Chief Engineer of the Louisville & Nashville; Harry H. Rousseau, Rear-Admiral United States Navy and member of the Panama Canal Commission; William P. Mason, Professor of Chemistry of the Rensselaer Polytechnic Institute; Washington A. Roebling, Vice-President John A. Roebling Company, Trenton, N. J.; David Reeves, President Phoenix Iron Company of Philadelphia; Isaac W. Frank, President United Engineering & Foundry Company, Pittsburgh, Pa.; Nelson P. Lewis, Chief Engineer Board of Estimate and Apportionment, New York City; O. F. Nichols, Chief Engineer Department of Bridges, New York City; Arthur B. de Saulles, Superintendent of the Bethlehem works of the New Jersey Zinc Company; Frank G. Smith, Brigadier-General, U. S. A., retired, Secretary of the Chickamauga and Chattanooga National Park; T. Guilford Smith, Regent of the New York State University; I. M. de Varona, Chief Engineer Department of Water Supply of New York; William H. Burr, Professor of Civil Engineering of Columbia University; J. Van W. Reynders, General Manager Pennsylvania Steel Company, Steelton, Pa.; A. L. A. Himmelwright, General Manager Roebling Construction Company, New York, and George S. Groesbeck, President Springfield Construction Company, Springfield, Mass.

The H. K. Porter Company, Pittsburgh, has received an order for 12 steel works locomotives for the new plant of the Indiana Steel Company at Gary, Ind.

PERSONAL.

Gen. William F. Draper has resigned as president of the Draper Machine Works, Hopedale, Mass., manufacturer of textile machinery.

Leon P. Fuestman has been elected first vice-president of the International Steam Pump Company, Nathan Fleischer has been elected treasurer to succeed Max Nathan, who resigned on account of age, and Benjamin Guggenheim has been elected chairman of the Executive Committee.

David Williams, president of the David Williams Company, publisher of *The Iron Age*, returned from Europe last week.

A number of the Cincinnati machine tool manufacturers will make European countries their objective point for spending the time usually set aside for summer recreation. Among those to start soon will be William Oesterlein, who sails July 9, and R. K. Le Blond and Philip Fosdick, who sail July 18. Business interests will receive a share of their time while abroad.

E. D. Edmonston, who has had much experience as an electrical engineer, filling responsible positions, recently serving as chief engineer of the American Construction Company, New Orleans, has joined the engineering staff of W. S. Barstow & Co., 50 Pine street, New York.

H. A. McMore of the engineering department of the Harlem Contracting Company, New York, has been engaged by the General Fireproofing Company, Youngstown, Ohio. He will be connected with the reinforced concrete department at the home office and works.

George G. McMurtry of New York sailed last week for a few months' stay in Europe.

Henry C. Frick is expected to go abroad early in July.

John J. Hill, assistant general superintendent of the Struthers plant of the American Sheet & Tin Plate Company, at Struthers, Ohio, has resigned, after being connected with the plant for 26 years.

H. E. Snyder, Frick Building, Pittsburgh, has been appointed representative in the Pittsburgh District for the Parker Boiler Company of Philadelphia, succeeding E. Emery, resigned.

Irwin B. Laughlin, son of George M. Laughlin of the Jones & Laughlin Steel Company, Pittsburgh, has been appointed second secretary of the American Embassy at St. Petersburg, Russia.

I. B. Stickney has resigned his position as superintendent of labor and transportation at the Ohio works of the Carnegie Steel Company, Youngstown, Ohio, and has been succeeded by I. A. Brown, who formerly held the same position at the new plant of the Jones & Laughlin Steel Company, Aliquippa, Pa.

W. W. Adams has been appointed manager of the Pittsburgh and Buffalo offices of the Browning Engineering Company for the sale of locomotive cranes and slag trolleys, and of the McGeorge Engineering Company for the sale of open hearth furnace charging machines. The Pittsburgh office is in the House Building, and the Buffalo office in the Erie County Bank Building.

A. A. Lane, for several years with the Taylor-Wilson Mfg. Company, Pittsburgh, Pa., has been engaged by the General Fireproofing Company, Youngstown, Ohio, as office manager of the reinforced concrete department.

At a meeting of the Buffalo & Susquehanna Coal & Coke Company and of the Buffalo & Susquehanna Coal Mining Company, held at Dalston, Pa., June 20, Ganson Depew of Buffalo was elected a director of both companies to fill the vacancy caused by the death of Frank H. Goodyear. The directors elected Charles W. Goodyear president of the two companies and Ganson Depew vice-president.

A. E. Colby of New York, consulting metallurgical engineer, will go to Europe early in July on a business trip covering some months.

R. E. Fox, Jr., has resigned the management of the

New York office of the Platt Iron Works Company to become secretary and manager of the sales department of the Engineer Company, 111 Broadway, New York. The Engineer Company manufactures and installs the balanced draft system of furnace regulation.

F. W. Rowe, formerly purchasing agent of the Aultman & Taylor Machinery Company, Mansfield, Ohio, has been appointed assistant purchasing agent of the General Electric Company, Schenectady, N. Y.

William Brusstar, manager of the E. & G. Brooke Iron Company, Birdsboro, Pa., severed his connection with that company June 1. He had been with the Brooke Company for 30 years, and will now give his entire attention to business interests of his own.

Dr. P. Héroult has gone to Héroult, Shasta County, Cal., where an electric iron making plant of his system is to be erected.

Garry Lavan, formerly superintendent of the blast furnaces of R. Heckscher & Sons, at Swedeland, Pa., has resigned, to become superintendent of blast furnaces of the LaBelle Iron Works, at Steubenville, Ohio, succeeding M. C. Steece, who has accepted the position of superintendent of the blast furnaces of the Inland Steel Company, Chicago.

OBITUARY.

WILLIAM FINDLAY SHUNK, famous as an engineer and director of many notable works, died at Lucknow, near Harrisburg, Pa., June 22, aged 77 years. He will, perhaps, be best remembered as the consulting engineer in the erection of the elevated railroad system of New York and an engineer of the Inter-Continental or Trans-Andean Railway and South Penn Railroad surveys. He was a native of Harrisburg, and the son of a governor and the grandson of a governor of Pennsylvania. About the time of the Mexican War he became a midshipman in the United States navy. He early evinced remarkable aptitude for engineering, and resigning from the Government service he entered that of the Pennsylvania Railroad Company, with which he was connected for several years. His South American work was commenced under authority of the first Pan-American congress, which had for its object the building of a railroad which would ultimately link the continents and become a transportation line of vast commercial importance. This work was commenced in Ecuador and Peru under the direction of Mr. Shunk in 1891, and continued for several years. His knowledge of engineering was coupled with a remarkable recognition of economic conditions. Several of his books on engineering were used as textbooks in colleges. His papers were always heard with closest attention at notable gatherings, and his monographs were extensively quoted.

GERMAN H. HUNT, one of the founders of the firm of Poole & Hunt, now the Poole Engineering & Machine Company, Baltimore, Md., died June 16 from paralysis, aged 78 years. He was a native of Baltimore, learned the trade of machinist, and when he reached the age of 22 he formed a business connection with the late Robert Poole. On January 1, 1851, they formed a partnership under the firm name of Poole & Hunt, and the development of this enterprise is one of the best chapters in the industrial record of Baltimore. On January 1, 1889, after 38 years of continuous connection with the firm, Mr. Hunt retired from business. From that time until his death he engaged in important financial undertakings. He leaves two daughters.

E. L. BABCOCK, founder of the Falls Rivet & Machine Company, Cuyaboga Falls, Ohio, and for years engaged in the management of that company, died June 17 at the Masonic Home, Springfield, Ohio, where he went two years ago because of ill health. He was 67 years of age.

HENRY H. SEYFERT, son of William M. Seyfert, and a member of the firm of L. F. Seyfert's Sons, Inc., machinery dealers, Philadelphia, died June 21 of appendicitis.

Banker Vanderlip on the Business Outlook.

In an extended address before the Virginia Bankers' Association at the Jamestown Exposition on June 21 Vice-President Frank A. Vanderlip of the National City Bank of New York discussed the bearings of certain political tendencies of the day on the business and financial outlook. He said in conclusion:

But now what of the future? Industry as yet has shown only scant signs here and there of declining activity. The crop outlook is not altogether satisfactory, but considering the advanced prices and the great stores left over from other harvests there is nothing in that situation to bring real disaster. The mercantile situation seems healthy. Labor is still fully employed at the highest rate of wages ever paid. The banking position is sound. But in spite of all this, in spite of a half year's record just closing, which in most lines of business will be the equal of last year's phenomenal figures, nearly all experienced business men are of the opinion that we are facing a practically certain recession in trade, that we have ahead of us a period of smaller industrial totals. Such a view is almost universal among well informed business men. There is no longer the disposition courageously to enter upon new enterprises. Railroads are curtailing expenditures. Bankers are inclined to exercise caution in extending accommodation. Most manufacturers and merchants are planning their fall campaigns with much conservatism.

That the period ahead of us is one in which commercial activities will be curtailed and manufacturers' totals show a decrease, there is really little division of well informed opinion. The question that is desirable to consider is only in relation to the extent of this recession. Will it be but a dip, lasting only a few months, giving us but time to catch our breath before we march on to renewed accomplishments in this most wonderful development of prosperity, or is there to be a more protracted and serious disturbance?

I believe the answer to that lies wholly in the public mind and temper. There is no inherent reason in the conditions of agriculture, trade, industry and finance in the United States that would make necessary a period of further disturbance and depression. There are a thousand influences that should lead toward continued prosperity and renewed accomplishments throughout the fields of industry and commerce. The business of the country will turn into one of these roads, solely as the result of whether or not the public and the public's legislative representatives are wise and patient or are hasty and inconsiderate. If the intricate problem of railroad regulation is worked out in a spirit of fairness and intelligence, if the vastness of the problem is recognized, if the involved relationships encountered are taken into account and the far reaching effects of paternal regulations when applied to so great and complicated a network are reckoned with, and if an intelligent understanding of the complications will lead to a patient attitude toward results, then I believe we will resume the road toward further prosperity. The moment that investors have become convinced that the problem is to have fair and patient consideration in its solution, we will start on that road again with full measured pace.

But if we are to have legislation based upon political advantage; if we are to adopt socialistic theories which will amount to the confiscation of property rights; if we are to have reprisal for past wrongs no matter how real; if action is the one thing wanted first, and the consideration of the intelligence and fairness of such action is to come afterward, then I believe it is possible that the whole business structure may be facing a danger, the proportion of which will be measured by the same vast figures as have been the totals that have marked the extent of our prosperity.

The Cheever Iron Ore Company, Port Henry, N. Y., recently incorporated with a capital stock of \$250,000, has purchased the property formerly owned by the Cheever Ore Bed Company, which has for many years

been well known in the iron and steel trade. The ore runs high in iron and low in phosphorus. The new company has built a cement power house, installed new hoisting machinery of the latest design and is now erecting a magnetic separator of about 300 tons capacity. Owing to the granular condition of the ore, it is expected that the separator will handle 500 tons a day. The officers and directors are Oliver S. Presbrey, president; Oliver H. Presbrey, vice-president and general manager; John O. Presbrey, secretary and treasurer; Edward H. Presbrey, general superintendent; Frank S. Witherbee, Walter C. Witherbee and Wallace T. Foote.

The Worth Brothers Company's Plate Mills.

The Worth Brothers Company, Coatesville, Pa., which recently purchased at the sale of the Saxton Company's properties the Valley Iron Works at Coatesville, previously operated by Charles Pennock & Sons, and subsequently by W. W. Kurtz & Co., has thoroughly remodeled and reconstructed one of the plate mills and put it in operation. The rolls have been cut down to 72-in. lengths. All of the machinery has been overhauled and put in first-class condition. Plate straightening rolls, as well as a large guillotine shear, have been installed. It has thereby been made practically a modern and up to date plate mill.

This company had previously been operating in its main plant one mill, containing 152-in. rolls; two mills, each containing 132-in. rolls; one mill, containing 90-in. rolls, and one mill, containing 60-in. rolls. Hence, with the addition of the remodeled mill, containing 72-in. rolls, it will have facilities for producing a still greater variety of sizes and gauges, being able, as is well known, to roll on the 152-in. mill plates and circles fully a foot wider than any other concern in the country.

It is proposed to roll on the new mill, which is known as the Valley mill, steel plates ranging from about No. 12 gauge up to $\frac{1}{4}$ and possibly 5-16 in., and in widths from narrow sizes up to the capacity of the mill, say, about 60 to 62 in. in plates and 64 to 66 in. in circles.

The company now has a daily capacity of at least 1000 tons of sheared steel plates, making it by far the largest producer of sheared steel plates in America, with the single exception of the Carnegie Steel Company.

La Belle Iron Works Improvements.—The La Belle Iron Works, Steubenville, Ohio, will install a 250 ton metal mixer, and will add another 50 ton open hearth furnace, giving it a total of 10 50-ton furnaces. A steel and brick machine shop, 52 x 165 ft., will be erected, which is to be two stories in height, the upper story to be given over to small tools and for a pattern shop. The machine shop will be commanded by a 15-ton electric crane. A steel and brick storeroom, 60 x 180 ft., will also be erected. This company has had under way for some time the erection of eight sheet and two jobbing mills and a three-high 72-in. plate mill. These mills are being built by the United Engineering & Foundry Company and Mesta Machine Company of Pittsburgh, and the Wheeling Mold & Foundry Company of Wheeling, W. Va. It is expected to have all improvements completed in October or November. The month of May was a record breaker for the works, both in output and earnings. The nine 50-ton open hearth furnaces made over 33,000 tons of steel, the blooming mill rolled 27,500 tons of blooms, and the 84-in. plate mill turned out over 6000 tons of sheared plates.

The news from New York that receivers have been appointed for Milliken Brothers, Incorporated, created a great deal of interest in Mexico, where the firm has a branch house engaged in the construction of buildings on a large scale, and has now several important contracts in hand. The local representative upon receipt of the report of the failure made the statement that the Mexican business of the firm would be nowise affected by the receivership.

NEWS OF THE WORKS.

Iron and Steel.

The West Virginia Rail Company has been organized, with a capital stock of \$100,000, by J. S. Ralston, president of the Ralston Steel Car Company; E. M. Huggins and H. A. Zeller, Columbus, Ohio, and A. W. Weringer, L. A. Pollock and George J. Comas, Huntington, W. Va. This company has taken over the rail mill at Huntington, W. Va., which was recently purchased by H. A. Zeller, and will manufacture light steel rails from 12 to 30 lb. E. M. Huggins has been elected president and H. A. Zeller treasurer and general manager. The Joseph Schonthal Iron Company, Columbus, has been appointed general sales agent.

The Duer Spring & Mfg. Company, formerly located at Twenty-sixth street and Liberty avenue, Pittsburgh, has moved its offices and equipment to its new plant at McKees Rocks, Pittsburgh, which is now in full operation.

The Amsler Engineering Company, engineer and contractor, Diamond Bank Building, Pittsburgh, is building three three-pass Amsler hot blast firebrick stoves at the blast furnace of the Jackson Iron & Steel Company, Jackson, Ohio. It has received an order for a gas producer for the Braeburn Steel Company, Braeburn, Pa.; 50-hp. Amsler suction gas producer for the White-Blakely Mfg. Company, Birmingham, Ala.; two 9 ft. 6 in. gas producers for the Columbia Glass Company, Wellsboro, Pa.; two 9 ft. 6 in. producers for the Owens Bottle Machine Company, Toledo, Ohio. For the Linton Rolling Mill Company, Linton, Ind., the company is building two 11-ft. producers and is remodeling the continuous rail reheating furnaces. A 250-hp. suction producer is being installed at the works of the Riverside Engine Company, Oil City, Pa.

No. 7 blast furnace of Carnegie Steel Company, at Rankin, Pa., is nearly completed and is expected to be ready for blast early in July. This will give the company a total of seven stacks at Rankin, with a daily output of 3500 to 4000 tons of pig iron.

The South Sharon, Pa., plant of the American Sheet & Tin Plate Company, South Sharon, Pa., will be closed down June 29 for two or three weeks in order to allow some needed repairs to be made. New coal trestles will be erected, and other improvements and additions to equipment will be made.

D. Lamond & Son, engineers and contractors, Ferguson Building, Pittsburgh, have received a contract for the building of a new blast furnace for the Ironton Furnace Company at Ironton, Ohio. The stack will be 18 x 75 ft., equipped with three 20 x 85 ft. C. H. Foote hot blast stoves. The contract for the ironwork for the stoves has been awarded to the Meehan Boiler & Construction Company, Lowellville, Ohio, and the contract for the furnace castings, standpipe and pipe fittings to the Olive Foundry, Ironton, Ohio. The order for the firebrick has been awarded to the Tygard Fire Brick Company, Cincinnati, Ohio, which will also furnish the No. 1 brick for the stoves. The balance of the stove brick will be furnished by the Oak Hill Fire Brick & Coal Company, Oak Hill, Ohio. Two 42 x 84 x 60 in. Welmer blowing engines have been purchased. The boiler plant will consist of 12 horizontal 6-in. flue boilers made by the Atlas Engine Works, Indianapolis, Ind. The officers of the Ironton Furnace Company are H. A. Marting, president; C. B. Fowler, vice-president; W. W. Marting, secretary and treasurer, and Charles Peters, superintendent.

General Machinery.

W. F. C. Livingston, proprietor of the Livingston Machine Shop, Nunda, Ill., has moved his plant and equipment from that place to Carpentersville, Ill.

The Hassell Iron Works Company, Colorado Springs, Colo., is planning extensions to its plant, which will take the form of a new brick building to be added to its machine shop. The additional machinery that will be required for the equipment of the new extension will be purchased by W. W. Hassell, president and general manager, who is now in the East.

Fogarty & Dickinson, San Luis Potosi, Mexico, dealers in machinery and supplies, whose offices and warehouses were recently destroyed by fire, expect to have their business re-established and in running order within the next 30 days.

The Rowland Machine Company, New Haven, Conn., reports business unusually good. It is busy on new and repair work for local and out of town parties. By the recent addition of an 88-in. Poole boring mill and a 6-ft. Prentiss radial drill in its machine shop and a complete equipment of new tools in its pattern shop, the company is now better prepared than ever to take machine, pattern and blacksmith work. It is also well equipped to do automobile repairing.

The Light Inspection Car Company, Hagerstown, Ind., will make additions to its plant, including a large machine shop. The company recently began manufacturing automobile engines, and has booked one contract at \$80,000 for three-cylinder gasoline engines for delivery in the next few months.

Power Plant Equipment.

The Stone & Webster Engineering Corporation has recently placed contracts for new equipment for the Pawtucket Electric

Company, including four 520-hp. Babcock & Wilcox boilers, equipped with Foster superheaters for 150 degrees superheat. This boiler room equipment is practically a duplicate of that recently ordered by the Texas Traction Company, of which the Fred A. Jones Company of Houston is consulting engineer, for operating the Curtis turbines in the new power station at McKinney, Texas. The Virginia Passenger & Power Company, Richmond, has also recently placed an order for Allis-Chalmers turbines and Babcock & Wilcox boilers, equipped with Foster superheaters for 175 degrees.

The George E. Dow Pumping Engine Company, San Francisco, Cal., has recently received a contract from the Southern Pacific Railroad for the installation of a pipe line for pumping oil through the San Joaquin Valley to the sea. This line will be 285 miles in length and will be equipped with 24 power stations, each station to be furnished with three Edge Moor water tube boilers of 250 hp. each, manufactured by the Edge Moor Iron Company, Edge Moor, Del. These boilers will be installed by the Tracy Engineering Company, Los Angeles and San Francisco, Cal., the Pacific agent of the Edge Moor Iron Company. This will be the largest installation of water tube boilers in the country for pumping oil.

The Mayor of Eunice, La., will receive bids until July 15 for the installation of a system of water works.

Bids will be received until July 9 for a complete water and light plant for Jackson, Mo.

Recent orders secured by the Pittsburgh office of the Parker Boiler Company, Philadelphia, include two 300-hp. boilers for the King Philip mine, Winona, Mich.; one 267-hp. boiler for the Perth Amboy Chemical Company, Perth Amboy, N. J., and two 234-hp. boilers for the Lafayette Building, Philadelphia.

The Canton Boiler & Engineering Company, Canton, Ohio, has increased its capital stock from \$30,000 to \$50,000.

Wood & Co., Camden, N. J., have been awarded the contract for a 25,000,000-gal. electric pump by the Board of Public Works, Buffalo, for the water works pumping station.

The Southwark Foundry & Machine Company, Philadelphia, is installing a 28 x 36 in. Porter-Allen mill engine at the plant of the Firth-Sterling Steel Company, Demmler, Pa. The engine will develop about 1400 hp.

The Engineers Supply Company, Pittsburgh, has been awarded a contract from the Armstrong Cork Works, for its Lancaster plant, for six Kitts feed water regulators. The company is also installing 20 Kitts feed water regulators at the Edgar Thomson Works of the Carnegie Steel Company.

Foundries.

The General Electric Company, Schenectady, N. Y., has recently added to its equipment in the foundry department a No. 84 cupola, with stack 74 ft. high, which was purchased from the Northern Engineering Works, Detroit, Mich. This cupola has a capacity of 16 tons per hour.

Michael Hayman & Co., Buffalo, N. Y., dealers in metals, are erecting a large foundry at East Ferry and Sheridan streets and New York Central Belt Line.

The Cedarburg Foundry Company, Cedarburg, Wis., recently incorporated with a capital of \$5000, will make a general line of castings and do machinery repair work. The incorporators are J. Lauterbach, T. Lauterbach, M. Richard and A. Goldberg.

George H. Thacher & Co., Albany, N. Y., manufacturers of car wheels, have purchased the business of the Coe improved combustion system from the New York Grate Bar Company and are now manufacturing the apparatus in their plant at Albany. They are prepared to furnish this equipment and install it promptly, also to equip furnaces with Coe's improved shaking and dumping grates.

The Spartan Mfg. Company, Galesburg, Ill., has been induced by the Citizen's Industrial Committee of Pontiac, Ill., to move its works to that place. The output of the factory consists principally of feed mills, castings for which will be made in its own foundry. Contracts have been let for a main building, 50 x 180 ft., and a foundry, 60 x 100 ft., which will be completed about August 15. About \$15,000 will be expended in improvements and new equipment.

The Flour City Ornamental Iron Works, Minneapolis, Minn., recently sustained a severe damage by fire. Repairs have been made and work resumed. The company has in contemplation the erection of a fireproof foundry 75 x 200 ft., plans for which are now being drawn. This improvement is being undertaken with a view of providing space and equipment to take care of large contract work.

Victor Beutner, consulting engineer, Westinghouse Building, Pittsburgh, has drawn plans for the erection of a steel and concrete foundry building, 90 x 180 ft., for the Sterrit-Thomas Foundry Company, Pittsburgh, to replace a structure destroyed by fire. The building will include a pattern storage shop of slow burning construction 48 x 120 ft. The building will be equipped with two 10-ton cranes and two 2-ton cranes, contracts for which have been placed. The new plant is expected to be ready for operation in about three months. Mr. Beutner has

also drawn plans for the erection of a new foundry building, 60 x 240 ft., for the Iron City Sanitary Mfg. Company at Zelienople, Pa. The building will be of steel and concrete construction, and will be equipped with 16 Herman pneumatic molding machines of a design that will allow large bathtubs and other sanitary ware to be machine molded. This new foundry is expected to have a capacity for handling 2000 castings per day. The molding and pouring will be continuous, and a runway will be installed to handle automatically the molds and sand. The Iron City Sanitary Mfg. Company now has a capacity of 60 tons of castings per day, which will be increased to 80 tons when the new plant is completed. Mr. Beutner is also remodeling the plant of Lutz & Schramm of Allegheny. He is installing two 200-hp. water tube boilers of Erie City make and is remodeling the whole mechanical equipment, installing a complete motor drive. The latter has not been specified, but will be soon.

Bridges and Buildings.

The McClintic-Marshall Construction Company, Pittsburgh, has received a contract for the erection of a steel bridge across the Little Kanawha River by the Parkersburg & South Side Bridge Company, Parkersburg, W. Va., in which about 700 tons of steel will be used.

T. H. Brooks & Co., Cleveland, Ohio, have been awarded the contract for the structural iron work for the new First National Bank Building in that city. The building will require about 950 tons.

The sales and estimating department formerly maintained at Canonsburg, Pa., by the Fort Pitt Bridge Works has been moved to the general offices of the company in the House Building, Pittsburgh. On account of its increasing business an extension is now being made to its erecting shop 70 x 200 ft. Among contracts it has recently completed is one for the Delaware, Lackawanna & Western Railroad at Jersey City, N. J., which included a number of girders 110 ft. long by 10 ft. 2 in., each to weigh 60 tons.

Fires.

The plant of the American Engineering & Foundry Company, Los Angeles, Cal., was recently damaged \$40,000 by fire.

The plant of the Camden White Lead Company, Camden, N. J., was damaged \$50,000 by fire June 22.

The plant of the Buffalo Crucible Steel Casting Company was damaged \$5000 by fire June 17.

The plant of the California Wheat Starch Company, Stockton, Cal., was destroyed by fire June 16, the loss being about \$50,000.

Fire destroyed the coal hoisting machinery at the coking ovens of the Lackawanna Steel Company's plant at Buffalo, N. Y., June 20. Fortunately the company has a sufficient supply of coke ahead to carry along the work of the plant while the machinery is being put in shape.

Hardware.

The Spellacy-Raiff Company, Coshocton, Ohio, will erect an addition to its enameling plant two stories high and about 50 x 80 ft., which will about double the capacity.

At a special meeting of the directors of the Columbus Lock Nut & Washer Company held recently Harry Thomas, formerly bookkeeper of the company, was elected secretary and treasurer. I. R. Ayers, who has been acting as secretary, becomes sales agent.

The Cleveland Time Lock Company, Cleveland, Ohio, has been incorporated, with a capital stock of \$5000, by C. C. Mann, Frank Poplowsky, Louis Hirsch, T. B. Wolf, Jr., and G. R. Henry. The company will manufacture time locks for store doors and other purposes. The company will not erect a manufacturing plant of its own.

The Columbus Woodenware Company, Columbus, Ohio, has been incorporated, with a capital of \$75,000, by W. S. S. Rodgers, A. D. Rodgers, B. E. Poste, A. D. Rodgers, Jr., and Rufus R. Shipley. The company will make wooden ware, washing machines and cooperage.

The Rockford Lock Company, Rockford, Ill., has been incorporated, with a capital stock of \$2500, for the purpose of manufacturing cabinet locks and hardware. This company is affiliated with the National Lock Company of Rockford.

The Seneca Chain Company is erecting at Mansfield, Ohio, an entirely new chain plant, in which will be installed 120 fires, to manufacture chains such as are at present being produced at the company's Kent, Ohio, plant. This material increase in capacity has been necessitated by the rapid growth in the demand for the company's product.

P. Kearns and A. C. Faust, formerly president and secretary-treasurer, respectively, of the Stuart & Peterson Company, Burlington, N. J., have disposed of part of their holdings in the company, although they still retain a large interest as stock and bond holders. The new officers of the company are George E. Shaw, president of the Western National Bank of Philadelphia, president; H. M. Norton, secretary-treasurer, and P. Kearns, general manager. The new officers intend to make large improvements in the plant to accommodate the materially increased business. The company manufactures tinned and enameled

hollow ware, hardware specialties, porcelain lined bathtubs, bottlers' goods, chemists' goods, ranges, heaters, &c.

The Palmyra Woodwork Mfg. Company, Palmyra, Pa., has been organized with a capital of \$10,000 paid in. The company will manufacture a line of household specialties.

The Arcade File Works, Anderson, Ind., have completed plans for extensive improvements in the plant.

The Toledo Metal Wheel Company, Toledo, Ohio, has increased its capital stock from \$150,000 to \$500,000.

The Monarch Specialty Company, Columbus, Ohio, manufacturer of washing machines, water lifts, water motors, &c., is intending to increase its capital stock from \$25,000 to \$300,000. E. J. Smith is president of the company.

The Ohio Stove Pipe & Mfg. Company, New Philadelphia, Ohio, manufacturer of Smith's double lock pipe, reports a large increase of business this year over previous years. The company is putting a new pipe on the market, known as the Ohio lock seam pipe, which is meeting with much favor among the trade.

The Sidway Mercantile Company, manufacturer of go-carts, bedside tables, shaving stands, costumers, &c., Elkhart, Ind., has lately been running its plant 22 hours a day, employing 350 hands. The company has given out a contract for an addition to the factory which will provide 35,000 sq. ft. of floor space.

Miscellaneous.

The firm of Johnston, Morehouse & Dickey, Pittsburgh, mine and mill supplies, will make application for a State charter under the name of Johnston-Morehouse-Dickey Company. The warehouse, store and offices of the company are located at 106 Market street, Pittsburgh.

Reports from Mexico City, Mexico, state that the Mexican Car & Foundry Company, which established a large car building plant about two years ago, has gone into bankruptcy.

The Cutler-Hammer Mfg. Company, Milwaukee, Wis., has purchased the Wirt Electric Company, Philadelphia, and will continue the manufacture of the Wirt apparatus. The acquisition of the latter business will enable the company to meet more fully the requirements of the trade, as the line taken over includes types of apparatus that have a wide reputation, particularly the battery charging rheostats and field rheostats, which in 1902 were awarded the John Scott Medal on recommendation of the Franklin Institute of Pennsylvania.

The Barlow Mfg. Company, Holyoke, Mass., will have its new plant completed and in operation about July 1, when it will have increased facilities for doing light metal work of all kinds in brass, steel and iron and the manufacture of brass castings and brass and steel tubing. The new plant is located on Winter street and is four stories high, 70 x 130 ft., with ell 30 x 60 ft., of brick construction.

The Toledo Gas, Electric & Heating Company, Toledo, Ohio, has been purchased by the Toledo Railways & Light Company, the deal having been ratified at meetings of the directors and stockholders of the two companies held a few days ago. The former company voted to increase its stock from \$12,000,000 to \$15,000,000 to carry out the terms of the purchase.

The Toledo Storage Battery Company, Toledo, Ohio, has been reorganized and plans are now under way for increasing the output of the plant. J. M. Skinner, who is now president of the company, has been succeeded as secretary-treasurer and general manager by E. P. Breckenridge, president of the Toledo Machine & Tool Company.

The Atlas Car & Mfg. Company, Cleveland, Ohio, has recently received good sized orders for industrial cars from new Western copper smelters, one located in Salt Lake City and the other to be built in California. The company also has under construction four large garbage cars, with a capacity of 100,000 lb. each, for the city of Cleveland.

The Welsbach Company has leased a new five-story building, 25 x 187 ft., adjoining its Western distributing headquarters at Lazelle and Chestnut streets, Columbus, Ohio, and will use it for manufacturing purposes.

The Berger Mfg. Company, Sheet metal worker, Canton, Ohio, is erecting two large warehouses for its roofing and galvanizing departments. One building will be 60 x 160 ft. and the other 60 x 110 ft.

Though the first steamer propelled by turbines was completed only 10 years ago, the Turbinia, "Lloyd's Register" records that out of a total of 68 vessels having a speed of 20 knots or better, 10 are turbine propelled. The total horsepower of marine turbines completed and under order is about 1,000,000. It has been found that the channel boats, many of which have been fitted with turbines, use from 15 to 25 per cent. less coal per trip than do those with reciprocating engines, besides requiring fewer men in the engine room, and making smaller demands upon oil and other stores. With few exceptions, all of these turbine vessels have three shafts, with a high pressure turbine upon the central one and low pressure turbines upon the wing shafts.

The Iron and Metal Trades

Again and again evidence is cropping up that melters have not covered their requirements of Pig Iron as fully as was claimed, and they appear in the market for early deliveries. In this way there are spells of dullness alternating with fresh buying, on a scale sufficiently large to halt a declining tendency. In the tidewater territory the continued importations of foreign iron are putting pressure on the Foundry Iron markets, since Middlesbrough No. 3 is selling at \$20.50 to \$21 ex ship. Even adding \$1 to \$1.50 for freight to consumer's yards, there is a tempting difference in favor of imported iron.

It is understood that the bulk of the Basic Pig Iron for which the Milliken Company had contracted for forward delivery has been placed. Some of the iron for the last quarter has been offered at \$22.85 delivered. There has been one sale of 4000 tons of Low Phosphorus Iron in eastern Pennsylvania.

In some quarters there is some uneasiness over the possibility of a strike among the blast furnace workers in the Mahoning and Shenango valleys. While there may be isolated instances of stoppage, it is not believed that the movement will be general, because the organization of the men is not trusted by them.

So far as the Finished Iron and Steel trades are involved, the outlook for a peaceful continuance of work is good. The Sheet and Tin Plate scales for the coming year are settled and the Puddling and Bar mill scales are under negotiation.

The market for Steel Billets continues easier under larger offerings. On the other hand, buyers of Sheet and Tin Plate Bars have been notified by the Carnegie Steel Company of an advance of \$1 per ton on their third quarter contracts.

In Pittsburgh a large tonnage of Sheared Skelp has been booked for delivery during the third quarter.

In the Plate trade the principal development of the week has been the placing of an aggregate tonnage of 22,000 to 23,000 tons for the seven Lake carriers recently ordered from the shipyards.

So far as the volume of the business coming up is concerned, the Structural trade is doing well. Prices for erected work are suffering somewhat under sharp competition. The New Haven Road has placed 1500 tons of bridge work, and is in the market for 1000 tons more. The steel for the Subway Loop has gone to two structural companies, the aggregate being about 5000 tons. It calls also for from 4000 to 5000 tons of Reinforcing Bars. Among the work coming up in the Chicago District are 3000 tons for the Frisco shops at Springfield, Mo., 2500 tons for a bridge at Ft. Snelling, and 7000 tons for the La Salle Hotel. The contract for 7000 tons of bridge work for the Great Northern, which has been in the market before, is not yet placed. The Northern Pacific is figuring on 14,000 tons of bridge work.

An advance of \$2 per ton on Galvanized Sheets is talked of. Steel Bar business is still good. One Chicago interest booked 14,000 tons during the past week.

There is some activity in Cast Iron Pipe. A block of 9000 tons was sold by a leading interest. New York is in the market for 6000 tons and may need 20,000 tons more.

The Copper market is still unsettled. It is regarded as likely that negotiations between domestic producers and consumers will come to a head within the next 10 days. In the meantime American Electrolytic Copper is being sold for shipment abroad at prices equivalent to 22c., New York.

A Comparison of Prices.

Advances Over the Previous Month in Heavy Type,
Declines in Italics.

At date, one week, one month and one year previous.

June 26, June 19, May 29, June 20,
1907. 1907. 1907. 1906.

PIG IRON, Per Gross Ton:				
Foundry No. 2, Standard, Philadelphia	\$24.50	\$24.50	\$25.50	\$18.50
Foundry No. 2, Southern, Cincinnati	24.25	23.75	24.25	16.25
Foundry No. 2, Local, Chicago	26.00	26.00	26.50	18.00
Bessemer, Pittsburgh	24.15	24.15	24.35	18.35
Gray Forge, Pittsburgh	23.15	23.15	22.90	16.35
Lake Superior Charcoal, Chicago	27.50	27.50	27.50	19.00

BILLETS, &c., Per Gross Ton:				
Bessemer Billets, Pittsburgh	29.50	29.50	30.00	27.00
Forging Billets, Pittsburgh	33.00	34.00	35.00	33.00
Open Hearth Billets, Phila.	32.50	32.50	32.50	29.00
Wire Rods, Pittsburgh	36.50	37.00	37.00	34.00
Steel Rails, Heavy, Eastern Mill	28.00	28.00	28.00	28.00

OLD MATERIAL, Per Gross Ton:				
Steel Rails, Melting, Chicago	18.75	19.00	18.50	14.00
Steel Rails, Melting, Phila.	19.00	20.00	19.50	16.25
Iron Rails, Chicago	24.50	24.50	24.50	21.25
Iron Rails, Philadelphia	27.50	27.50	27.50	20.50
Car Wheels, Chicago	25.00	25.50	25.50	18.00
Car Wheels, Philadelphia	25.00	25.50	25.50	16.75
Heavy Steel Scrap, Pittsburgh	18.25	18.25	18.50	15.50
Heavy Steel Scrap, Chicago	16.50	16.50	16.00	13.00
Heavy Steel Scrap, Philadelphia	18.25	18.75	19.00	15.75

FINISHED IRON AND STEEL,				
Per Pound:	Cents.	Cents.	Cents.	Cents.
Refined Iron Bars, Philadelphia	1.83½	1.83½	1.83½	1.63½
Common Iron Bars, Chicago	1.78	1.78	1.76½	1.66½
Common Iron Bars, Pittsburgh	1.70	1.70	1.75	1.50
Steel Bars, Tidewater, New York	1.86	1.86	1.84½	1.64½
Steel Bars, Pittsburgh	1.60	1.60	1.60	1.50
Tank Plates, Tidewater, New York	1.86	1.86	1.84½	1.74½
Tank Plates, Pittsburgh	1.70	1.70	1.70	1.60
Beams, Tidewater, New York	1.86	1.86	1.84½	1.84½
Beams, Pittsburgh	1.70	1.70	1.70	1.70
Angles, Tidewater, New York	1.86	1.86	1.84½	1.84½
Angles, Pittsburgh	1.70	1.70	1.70	1.70
Skelp, Grooved Steel, Pittsburgh	1.90	1.90	1.85	1.57½
Skelp, Sheared Steel, Pittsburgh	1.90	1.90	1.90	1.60

SHEETS, NAILS AND WIRE,				
Per Pound:	Cents.	Cents.	Cents.	Cents.
Sheets, No. 27, Pittsburgh	2.50	2.50	2.50	2.40
Wire Nails, Pittsburgh	2.00	2.00	2.00	1.85
Cut Nails, Pittsburgh	2.05	2.05	2.05	1.75
Barb Wire, Galv., Pittsburgh	2.45	2.45	2.45	2.30

METALS, Per Pound:				
	Cents.	Cents.	Cents.	Cents.
Lake Copper, New York	23.50	23.75	24.62½	18.62½
Electrolytic Copper, New York	22.00	22.50	23.50	18.62½
Spelter, New York	6.40	6.40	6.45	6.05
Spelter, St. Louis	6.35	6.35	6.30	6.10
Lead, New York	5.75	5.75	6.00	5.90
Lead, St. Louis	5.62½	5.65	5.92½	5.90
Tin, New York	43.75	43.25	42.50	38.60
Antimony, Hallett, New York	12.00	12.00	17.00	24.00
Nickel, New York	45.00	45.00	45.00	45.00
Tin Plate, 100 lb., New York	\$4.09	\$4.09	\$4.09	\$3.94

Chicago.

FISHER BUILDING, June 25, 1907.

Notwithstanding the heavy purchases of Steel Bars already made by the implement, car building and other manufacturing interests, further bookings of important tonnage are reported for last week. New orders closed by one maker footed up close to 14,000 tons. No great amount of additional tonnage will be required to fill the rolling schedules of local mills for the remainder of the year. While there is a large amount of Structural work being figured on, and still more in sight, it is noticeable that a large part of it is very dilatory in coming to closure. The present high cost of construction is doubtless in a large measure responsible for deferred action since it is asserted that money loaning agencies are on this account curtailing loan limits. Where formerly 75 per cent. was regarded as a conservative advance, 60 per cent. is now represented as the maximum limit generally fixed. Contracts now in hand, however, are sufficient to keep fabricators busy for some months to come. A lull in Rail buying has left the market without a single transaction to record for Standard Sections during the week just past, though indications point to still further purchases of note in the near future. The entire commercial world is anxiously watching the progress of the threatened telegraph strike, which, if it should extend beyond its present inception at San Francisco, would seriously interfere with the conduct of business in every line. Though Pig Iron prices have suffered no further decline, there is a practical cessation of buying for either prompt or forward delivery. Several inquiries for round lots covering fourth quarter require-

ments are reported, but buyers hesitate to close at ruling prices and, so far, the furnace interests have shown no disposition to make concessions. Aside from Scrap which, as was expected, has receded sharply from the high levels recently reached, prices in all lines of crude and finished material are well maintained.

Pig Iron.—In point of tonnage transactions in Pig Iron for the past week have been extremely light. Not for many months has the total of sales for a like period fallen so low. A few cars of spot Iron and some scattering sales of small lots for last quarter delivery comprise the week's business. But withal the apathy of buyers is seemingly met by an equal degree of indifference on part of sellers. The combined inaction of the opposite interests has, however, had no visible effect upon prices. No further recession in spot Iron is apparent, \$22, Birmingham, being the minimum offered for Southern No. 2 Foundry, and \$26 for Northern No. 2. For third quarter \$21 to \$21.50, Birmingham, is still held, but no sales for this delivery are reported. A readjustment of the spot and third quarter price will be due next week, for, with the advent of the third quarter at that time, these prices must be brought together either by the advance of one or decline of the other. Quotations of the various interests for future delivery are unchanged and range about as follows: Southern No. 2 Foundry, third quarter, \$21 to \$21.50; fourth quarter, \$20 to \$21; first quarter, 1908, \$18.50, Birmingham. For Northern No. 2 Foundry and Malleable Bessemer \$25.50 is asked for last quarter. The following prices are for June delivery, f.o.b. Chicago:

Lake Superior Charcoal.....	\$27.50 to \$28.00
Northern Coke Foundry, No. 1.....	26.50 to 27.00
Northern Coke Foundry, No. 2.....	26.00 to 26.50
Northern Coke Foundry, No. 3.....	25.50 to 26.00
Northern Scotch, No. 1.....	26.50 to 27.00
Ohio Strong Softeners, No. 1.....	26.00 to 26.50
Ohio Strong Softeners, No. 2.....	25.50 to 26.00
Southern Coke, No. 1.....	26.85 to 27.35
Southern Coke, No. 2.....	26.35 to 26.85
Southern Coke, No. 3.....	25.85 to 26.35
Southern Coke, No. 4.....	25.35 to 25.85
Southern Coke, No. 1 Soft.....	26.85 to 27.35
Southern Coke, No. 2 Soft.....	26.35 to 26.85
Southern Gray Forge.....	24.85 to 25.35
Southern Mottled.....	24.85 to 25.35
Malleable Bessemer.....	26.00 to 26.50
Standard Bessemer.....	24.80 to 25.30
Jackson Co. and Kentucky Silvery, 6 %	31.30 to 31.80
Jackson Co. and Kentucky Silvery, 8 %	32.30 to 32.80
Jackson Co. and Kentucky Silvery, 10 %	33.30 to 33.80

Billets and Rods.—The demand for Forging Billets is of normal character, with no sales of round lots reported. There is, however, an inquiry in the market for 5000 tons to cover future requirements, but on account of the sharp concession over ruling prices sought, it is not believed to be backed by a firm determination to buy. Prices ranging from \$36 to \$38 are still quoted. Wire Rods, in which there is no active movement, are quoted at \$37 to \$38, Pittsburgh.

Rails and Track Supplies.—No purchases of Steam Rails are reported, nor are there any inquiries for considerable lots noted. Business in Traction Rails is conspicuous by its absence. Of the large requirements of various interurban projects that were prominently to the fore in the early months of the year nothing is now heard. It is assumed that the difficulties of financing these deals have prevented their development. Track Supplies are in fair demand. We quote as follows: Angle Bars, accompanying Rail orders, 1907 delivery, 1.65c.; car lots, 1.90c. to 1.95c.; Spikes, 2.35c. to 2.45c., according to delivery; Track Bolts, 2.65c. to 2.75c., base, Square Nuts, and 2.80c. to 2.90c., base, Hexagon Nuts. The store prices on Track Supplies range from 0.15c. to 0.20c. above mill prices. Light Rails, 30 to 45 lb. sections, \$35; 25-lb., \$36; 20-lb., \$37; 16-lb., \$38; 12-lb., \$39, f.o.b. mill. Standard Sections, \$28, f.o.b. mill, full freight to destination.

Structural Material.—Although specifications on contracts are being furnished freely and mill schedules are still well filled, there is a noticeable trend toward an easier movement. The total tonnage of new business offered is beginning to show some decrease. Fabricators, however, are generally well supplied with contracts for two to four months ahead. The Missouri Bridge & Iron Works has placed the contract to supply material, amounting to 920 tons, for the Eighteenth street bridge, St. Louis, with the American Bridge Company. Bids are to be opened to-day on 3000 tons for the Frisco shops at Springfield, Mo., for the construction of which the Arnold Company, Chicago, is engineer and contractor. Proposals for a Government bridge across the Mississippi River at Ft. Snelling, Minn., requiring about 2500 tons, will be opened July 19. Specifications for the new La Salle Hotel, which is planned for erection on the corner of Madison and La Salle streets, Chicago, are expected to be offered for figures early next month. This structure will require 7000 tons, and is under the direction of New York interests. Prices from store are quoted without change, at 2.05c. to 2.10c., and mill prices, at Chicago, are as follows: Beams and Channels, 3 to 15 in., inclusive, 1.88c.; Angles, 3 to 6 in., ¼-in. and heavier, 1.88c.; larger than 6 in. on one or both legs, 1.98c.; Beams, larger than 15 in., 1.98c.; Zees, 3 in. and over, 1.88c.; Tees, 3 in. and

over, 1.93c., in addition to the usual extras for cutting to extra lengths, punching, coping, bending, and other shop work.

Plates.—Slightly improved service in deliveries is reported by consumers, which in Universal Plates is more pronounced than in Sheared stock. There is, however, much yet to be desired in the way of betterment in this respect. Specifications are not lacking, and shipments from the mills are extremely heavy. Premium prices for prompt shipment have not disappeared entirely; from \$1 to \$2 a ton is yet asked for prompt service. We quote for future delivery as follows: Tank Plates, ¼-in. and heavier, wider than 6¼ and up to 100 in. wide, inclusive, car lots, Chicago, 1.88c. to 2.08c.; 3-16 in., 1.98c. to 2.18c.; Nos. 7 and 8 gauge, 2.03c. to 2.23c.; No. 9, 2.13c. to 2.33c.; Flange quality, in widths up to 100 in., 1.98c. to 2.08c., base, for ¼-in. and heavier, with the same advance for lighter weights; Sketch Plates, Tank quality, 1.98c. to 2.18c.; Flange quality, 2.08c. Store prices on Plates are as follows: Tank Plates, ¼-in. and heavier, up to 72 in. wide, 2.20c. to 2.30c.; from 72 to 96 in. wide, 2.30c. to 2.40c.; 3-16 in., up to 60 in. wide, 2.30c. to 2.40c.; 72 in. wide, 2.50c. to 2.65c.; No. 8, up to 60 in. wide, 2.35c. to 2.45c.; Flange and Head quality, 0.25c. extra.

Sheets.—The situation as respects deliveries is slightly better, and on sizes and gauges coming within the range of capacity of some of the independent mills reasonably prompt shipment can be made. There is, notwithstanding, a scarcity of both Black and Galvanized Sheets, which extends to store stocks. We quote mill shipments as follows, Chicago: Blue Annealed, No. 10, 2.03c.; No. 12, 2.08c.; No. 14, 2.13c.; No. 16, 2.23c.; Box Annealed, Nos. 17 to 21, 2.53c.; Nos. 22 to 24, 2.58c.; Nos. 25 to 26, 2.63c.; No. 27, 2.68c.; No. 28, 2.78c.; No. 29, 2.88c.; No. 30, 2.98c.; Galvanized Sheets, Nos. 10 to 14, 2.83c.; Nos. 15 and 16, 3.03c.; Nos. 17 to 21, 3.18c.; Nos. 22 to 24, 3.33c.; Nos. 25 and 26, 3.53c.; No. 27, 3.73c.; No. 28, 3.93c.; No. 30, 4.43c. Sheets from store: Blue Annealed, No. 10, 2.50c.; No. 12, 2.55c.; No. 14, 2.60c.; No. 16, 2.70c.; Box Annealed, Nos. 18 to 21, 2.80c.; Nos. 22 to 24, 2.85c.; No. 26, 2.90c.; No. 27, 2.95c.; No. 28, 3.05c.; No. 30, 3.45c.; Galvanized from store: Nos. 10 to 20, 3.30c. to 3.35c.; Nos. 22 to 24, 3.55c. to 3.60c.; No. 26, 3.65c. to 3.70c.; No. 27, 3.85c. to 3.95c.; No. 28, 4.15c.; No. 30, 4.65c. to 4.70c.

Bars.—With the larger consumers already pretty well covered as to forward requirements there is still a good tonnage of new contracts being booked. Orders totaling 14,000 tons were received by one mill interest within a week; among these was one for 2300 tons. Specifications against contracts are reported to be heavy. Quotations, Chicago, are as follows: Steel Bars, 1.78c., with half extras; Iron Bars, 1.78c.; Hoops, 2.18c., extras as per Hoop card; Bands, 1.78c., as per Bar card, half extras; Soft Steel Angles and Shapes, 1.88c., half extras. Store prices are as follows: Bar Iron, 2.10c. to 2.25c.; Steel Bars, 2c. to 2.10c.; Steel Bands, 2c., as per Bar card, half extras; Soft Steel Hoops, 2.35c. to 2.45c., full extras.

Merchant Pipe.—Pressure for delivery of deferred shipments continues strong, and in spite of record mill production the progress being made in catching up on accumulated business is discouragingly slow. Though there are no lots of notable tonnage reported, the general volume of business is large and shows no signs of decrease. The following mill discounts are quoted: Black Pipe, ¾ to 6 in., 71.2; 7 to 12 in., 68.2; Galvanized, ¾ to 6 in., 61.2. These discounts are subject to 1 point on the base. From store in small lots, Chicago jobbers quote 68 per cent. on Black Steel Pipe, ¾ to 6 in. About 4 points advance above these prices is asked for Iron Pipe.

Boiler Tubes.—Whatever curtailment of purchases the railroads may have made elsewhere, the effects of retrenchment are not seen in the demand for Locomotive Tubes. Orders from this source continue plentiful. Jobbers' stocks of Merchant Tubes are low as a result of slow and uncertain receipts from mills. Mill quotations for future delivery on base sizes are as follows: 2¼ to 5 in., in carload lots, Steel Tubes, 63.2; Iron, 50.2; Seamless, 49.2; 2½ in. and smaller, and lengths over 18 ft., and 2½ in. and larger, and lengths over 22 ft., 10 per cent. extra. Store prices are as follows:

	Steel.	Iron.	Seamless.
1 to 1½ in.....	35	35	35
1½ to 2¼ in.....	50	35	35
2½ in.....	52½	35	35
2½ to 5 in.....	60	47½	47½
6 in. and larger.....	60	35	..

Merchant Steel.—The rush of buying by consuming interests for season's requirements is pretty well over, and the tonnage booked compares favorably with last year's sales for the same period. There is a fair demand from jobbers for Tires and Shapes. Quotations are as follows: Planished or Smooth Finished Tire Steel, 1.98c.; Iron Finish, up to 1½ x ½ in., 1.93c.; Iron Finish, 1½ x ½ in. and larger, 1.78c., base; Channels for solid Rubber Tires, ¾ to 1 in., 2.28c., and 1½ in. and larger, 2.18c.; Smooth Finished Machinery Steel, 2.18c.; Flat Sleigh Shoe, 1.93c.; Concave

and Convex Sleigh Shoe, 2.08c.; Cutter Shoe, 2.46½c.; Toe Calk Steel, 2.33c.; Railroad Spring, 1.98c.; Crucible Tool Steel, 7¼c. to 8c., and still higher prices are asked on special grades. Shafting, 50 per cent. off in car lots, and 45 per cent. in less than car lots, base territory.

Cast Iron Pipe.—An order for 2100 tons of 6 to 12 in. pipe placed by the city of Chicago was taken by the United States Cast Iron Pipe & Foundry Company, and constituted the only transaction reported that involved any considerable tonnage. All bids on a recent letting of about 400 tons for Columbus, Ohio, were rejected. It is expected that new proposals will be invited. A moderate business in small lots of from 100 to 200 tons is being done, but on the whole trade is unusually quiet. We quote, per net ton, Chicago, as follows: Water Pipe, 4-in., \$38 to \$39; 6 to 12 in., \$37 to \$38; 16-in. and up, \$36 to \$37, with \$1 extra for Gas Pipe.

Coke.—Overproduction of any commodity connected with the manufacture of Iron and Steel has of late been a rare complaint, but the Coke industry seems just now to be suffering from its effects, and 72-hr. Connellsville Foundry Coke for forward delivery is quoted at \$3.15 to \$3.25 at ovens.

Old Material.—The expected reaction in Scrap has been realized in a general decline of from 50c. to 75c. a ton, which affected the greater part of the list. The withdrawal from the market of a number of large buying interests removed the props that have sustained the high level of prices. It is believed that with the turn of the market there will be largely increased offerings from the country, which have for some time been very light. The only railroad list in the market this week is one of 4300 tons from the Chicago, Burlington & Quincy. Prices are revised, and the following quotations are per gross ton, f.o.b. Chicago:

Old Iron Rails.....	\$24.50 to \$25.00
Old Steel Rails, rerolling.....	18.25 to 18.75
Old Steel Rails, less than 3 ft.....	18.75 to 19.25
Relaying Rails, standard sections, subject to inspection.....	28.00 to 30.00
Old Car Wheels.....	25.00 to 25.50
Heavy Melting Steel Scrap.....	16.50 to 17.00
Frogs, Switches and Guards, cut apart.....	17.50 to 18.00
Mixed Steel.....	12.50 to 13.00

The following quotations are per net ton:

Iron Fish Plates.....	\$18.75 to \$19.75
Iron Car Axles.....	26.00 to 26.50
Steel Car Axles.....	21.00 to 21.50
No. 1 Railroad Wrought.....	15.75 to 16.25
No. 2 Railroad Wrought.....	14.75 to 15.25
Railway Springs.....	15.75 to 16.25
Locomotive Tires, smooth.....	17.50 to 18.00
No. 1 Dealers' Forge.....	13.25 to 13.75
Mixed Bushing.....	11.75 to 12.25
Iron Axle Turnings.....	11.75 to 12.25
Soft Steel Axle Turnings.....	11.75 to 12.25
Machine Shop Turnings.....	11.75 to 12.25
Cast Borings.....	10.50 to 11.00
Mixed Borings, &c.....	10.50 to 11.00
No. 1 Mill.....	10.00 to 10.50
No. 2 Mill.....	9.00 to 9.50
No. 1 Boilers, cut to Sheets and Rings.....	11.50 to 12.00
No. 1 Cast Scrap.....	18.75 to 19.00
Stove Plate and Light Cast Scrap.....	15.25 to 15.75
Railroad Malleable.....	17.50 to 18.00
Agricultural Malleable.....	15.25 to 15.75
Pipe and Flues.....	12.50 to 13.00

Metals.—Users of Copper are buying sparingly and are not inclined to anticipate their wants in advance of immediate needs. On account of the depletion of stocks, dealers anticipate a spurt of buying soon. No change in prices is this week reported, except in Old Metals, which on most grades have declined about ¼c. We quote as follows: Casting Copper, 24½c. to 25c.; Lake, 26c. to 26½c., in car lots for prompt shipment; small lots, ¼c. to ¾c. higher; Pig Tin, car lots, 43¼c.; small lots, 44¼c.; Lead, Desilverized, 6.25c. to 6.35c., for 50-ton lots; Corroding, 7c. to 7.10c., for 50-ton lots; in car lots, 2¼c. per 100 lb. higher; Spelter, 6.87½c.; Cookson's Antimony, 24½c., and other grades, 23½c. to 24c.; Sheet Zinc is \$8.60 list, f.o.b. La Salle, in car lots of 600-lb. casks. On Old Metals we quote: Copper Wire, 20c.; Heavy Copper Wire, 20¼c.; Copper Bottoms, 18c.; Copper Clips, 18¾c.; Red Brass, 18c.; Red Brass Borings, 16¼c.; Yellow Brass, 15¼c.; Yellow Brass Borings, 14c.; Light Brass, 12¼c.; Lead Pipe, 5¼c.; Tea Lead, 4.90c.; Zinc, 5.15c.; Pewter, No. 1, 30c.; Tin Foil, 35c.; Block Tin Pipe, 40c.

Cincinnati.

FIFTH AND MAIN STS., June 26, 1907.—(By Telegraph.)

Pig Iron.—Inquiry during the week has been rather light, and the market is sluggish. Iron for forward delivery is apparently in least demand, most of the business offering being for early or spot delivery. Reports indicate that there is plenty of spot Iron available to meet the requirements of the trade, and as a consequence quotations have a considerable spread and are somewhat irregular. Anywhere between \$20.50 and \$21.50 for No. 2, Birmingham, is asked, and sales are being made on this basis. Third quarter prices are apparently well established and quotable at \$21

to \$21.50, with \$19.50 to \$20 asked for last quarter's delivery, while \$18.50 appears to be the minimum quotation for any delivery later than January 1, and an Indiana concern is said to have secured a six months' supply equivalent to about 3000 tons, at that quotation. The lower grades, while apparently scarcer than the standard Foundry Irons, are in light demand and easy. One of the large Cast Iron Pipe interests is said to be in the market for a considerable tonnage, delivery running throughout the remainder of the year. This will, perhaps, have some influence in establishing quotations and develop the exact strength of the market as it exists to-day. There is an inquiry from a local melter for 1000 tons of Foundry grades for delivery covering the balance of the year. Freight rates from the Hanging Rock District to Cincinnati are \$1.15 and from Birmingham \$3.25. We quote for June delivery, f.o.b. Cincinnati, as follows:

Southern Coke, No. 1.....	\$24.75 to \$25.25
Southern Coke, No. 2.....	24.25 to 24.75
Southern Coke, No. 3.....	23.75 to 24.25
Southern Coke, No. 4.....	22.75 to 23.25
Southern Coke, No. 1 Soft.....	24.75 to 25.25
Southern Coke, No. 2 Soft.....	24.25 to 24.75
Southern Coke, Gray Forge.....	21.75 to 22.25
Southern Coke, Mottled.....	20.75 to 21.25
Ohio Silvery, 8 per cent. Silicon.....	30.65 to 31.15
Lake Superior Coke, No. 1.....	24.65 to 25.15
Lake Superior Coke, No. 2.....	24.15 to 24.65
Lake Superior Coke, No. 3.....	23.65 to 24.15

Car Wheel Irons.

Standard Southern Car Wheel.....	\$29.00 to \$29.50
Lake Superior Car Wheel.....	27.50 to 28.00

Coke.—Large contracts have been made for Foundry grades for delivery running far into next year. Prices appear to be more firmly fixed, and considerable activity is evident on all sides. We quote the best brands of Connellsville and Virginia Foundry from \$3 to \$3.25, f.o.b. ovens.

Finished Iron and Steel.—Specifications on current contracts have been quite heavy, particularly on Plates. Deliveries of Structural Shapes are only fairly satisfactory, while on Plates prompt shipments can be secured, especially on Universal mill Plates. A heavy tonnage of Structural Shapes and Plates has been booked for the latter half of the year, but with no sales reported running into next year. Deliveries on Steel Bars and Tire can be had in 60 to 90 days, and several good sales have been reported running into 1908. The Rivet market is very strong, and prices are firm. We quote, f.o.b. Cincinnati, as follows: Iron Bars, carload lots, 1.80c., with half extras; smaller lots from store 2c. with full extras. Steel Bars, carload lots, 1.75c., half extras; smaller lots from store, 1.95c., with full extras. Base Angles, carload lots, 1.85c. Beams and Channels, carload lots, 1.85c., base. Plates, ¼-in. and heavier, carload lots, 1.85c., base, and smaller lots from store, 2.25c. Sheets No. 16, carload lots, 2.05c., and smaller lots from store 2.60c.; No. 14, carload lots, 1.95c., and smaller lots from store, 2.50c. Steel Tire, 1 x ¼ in. or heavier, 1.95c., in carload lots.

Old Material.—The demand is rather light, and the market is easy. We quote dealers' prices, f.o.b. Cincinnati, about as follows:

No. 1 R. R. Wrought, net ton.....	\$16.50 to \$17.00
Cast Borings, net ton.....	9.00 to 9.50
Steel Turnings, net ton.....	12.00 to 12.50
No. 1 Cast Scrap, net ton.....	17.50 to 18.00
Old Iron Axles, net ton.....	25.50 to 26.00
Old Iron Rails, gross ton.....	24.00 to 25.00
Old Steel Rails, long, gross ton.....	17.50 to 18.00
Relaying Rails, 56 lb. and up, gross ton.....	23.25 to 23.75
Old Car Wheel, gross ton.....	24.00 to 24.50
Low Phosphorus Scrap, gross ton.....	19.50 to 20.00

Birmingham.

BIRMINGHAM, ALA., June 25, 1907.

Pig Iron.—Nothing has occurred the past week to disturb the quietude which has prevailed in the Pig Iron market for the last month. The furnace people are, however, not unnecessarily exciting themselves regarding conditions, and are content to let things rock along, manifesting a complete indifference as to the final outcome. Orders recently have been confined to a few sales of spot Iron, and to a still smaller tonnage for delivery during the first quarter of next year. These, it is reported, were sold at the prices heretofore prevailing. A careful canvass of the situation here fails to show any concessions whatever in prices, which the exception of one or two small concerns who are offering spot Iron at slightly lower than formerly. There has been all along a considerable difference in quotations for the different deliveries by the various sellers, and these have not been changed. This is probably due to the fact that, inasmuch as there is no business to be had, it would be useless to make any concessions in prices. Quotations are about as follows: Spot shipment, \$22 to \$23; third quarter, \$21 to \$22; last quarter, \$20 to \$21; first-quarter 1908, \$18.50. Several of the furnaces in the district have been working badly for the past few weeks and some accumulation of off grades is noticed, but with this exception the yards are clear of Iron. Melters are as insistent on deliveries as ever, and it is stated that absolutely no requests have been received

to withhold shipments. The railroads are furnishing all the cars required and shipments are moving forward in a most satisfactory manner.

Cast Iron Pipe.—The United States Cast Iron Pipe & Foundry Company was the successful bidder on 2100 tons of Water Pipe for Chicago and about 2000 tons for Atlanta, Ga., during the past week. No lettings of importance are announced for the coming week. Quotations are well maintained and are approximately as follows per net ton on Water Pipe: 4 to 6 in., \$36; 8 to 12 in., \$34; over 12-in., average \$31, with Gas Pipe \$1 extra per ton.

Old Material.—The Scrap market, while rather quiet, shows an improvement over last week. This is especially true of Wrought and Steel, for which there has been a very good demand. No trouble has been experienced for a long time in disposing of all the Heavy Cast that can be secured. Dealers' quotations are about as follows per gross ton, f.o.b. cars here:

Old Iron Rails.....	\$22.00 to \$22.50
Old Iron Axles.....	18.50 to 19.00
Old Steel Axles.....	17.50 to 18.00
Old Car Wheels.....	20.50 to 21.00
No. 1 Railroad Wrought.....	18.50 to 19.00
No. 2 Railroad Wrought.....	13.00 to 13.50
No. 1 Country Wrought.....	13.00 to 13.50
No. 2 Country Wrought.....	12.00 to 12.50
Wrought Pipe and Flues.....	13.50 to 14.00
Railroad Malleable.....	14.00 to 14.50
No. 1 Steel.....	15.00 to 15.50
No. 1 Machinery Cast.....	16.50 to 17.00
Stove Plate and Light Cast.....	13.00 to 13.50
Cast Borings.....	8.50 to 9.00

The Southern Steel Company announces that it will in the near future begin the erection of a forging plant at Gadsden, Ala., in which it is proposed to turn out about 50 to 60 tons of car axles per day. This is the first step looking toward the building of a steel car plant which the company has heretofore indicated it would erect during the present year.

Philadelphia.

PHILADELPHIA, PA., June 25, 1907.

The Iron and Steel trades have reached a point at which they appear to have struck midsummer dullness, during which period the market is usually more or less in a condition of abeyance. That may truly be said to be the case at the present time, as interest in Pig Iron seems to have ceased. Prices are not materially lower, but the demand is of such small proportions that prices at which sales are made are of no great significance. The probabilities are that these conditions will continue well through the summer months. The inactivity may be brief or it may be protracted, the chances favoring the latter. It must not be forgotten, however, that consumers loaded up very heavily during the late winter and early spring months, so that all they have to do now is to take deliveries according to contract. This, of course, implies that the furnaces are in a similar condition as regards their current output. They are not under pressure to seek new business, having about all they can do to complete their end of the contracts for deliveries during the remainder of the year. Under such conditions there is not much need for a market either to buy or sell in, except for such small surpluses as the furnaces may perchance acquire from week to week, and for such small lots as buyers may need to tide them over emergencies. It would therefore be no easy matter to predicate upon quotations two or three months later on, for the reason that there is no certainty whether either consumption or production can be maintained on the present basis. A slight change in the proportion of either of these would do much toward determining the final result as regards prices. It is doubtful if ever there was a time when forecasts in regard to the future were more difficult than they are to-day, and as the trade has had a succession of genuine surprises during the last couple of years, it is a little afraid to commit itself to any fixed position, pending further developments in regard to crops, finances, &c. The remarkably fine weather which we have had during the past ten days has done a good deal toward restoring confidence in regard to the crops, although it is still felt that important changes may occur before definite results can be known. Under such conditions it can hardly be expected that there will be any great activity during the next few weeks, although there is a fair prospect that business during that period may at least hold its own, subject to the usual midsummer dullness.

Pig Iron.—Owing to the suspension of Steel making at two mills in the vicinity of New York City considerable shifting around of both Pig and Scrap material will have to be done. What effect this will have on the market is not clear. It is said that fabricated work will be completed just the same, and that the Steel and finished material will be furnished by other nearby mills, in which case it will be merely a change in the center of activity, and will involve no decrease in the consumption of Pig Iron. Nevertheless, Pig Iron intended for delivery to these concerns has been offered for resale during the past few days, which gives the

impression that there is less scarcity than was supposed, although the deliveries are specified for the last quarter. The question of prices as regards Pig Iron during 1907 is not likely to show any material change, although there can be little doubt that the highest figures have been reached, possibly for a long period of time. Almost imperceptibly \$1 to \$2 per ton from the extreme figures has already been lopped off, and three or four months from now a similar reduction may be noticeable, but if there is going to be a decline it will be by easy stages, so that it will involve no serious consequences to either buyers or sellers. The outcome of the crops and the condition of the money market may yet exercise an important influence on trade conditions, and as regards the first named there has been a most remarkable transformation during the past two or three weeks, which if maintained a few weeks longer may be worth hundreds of millions more than seemed probable a month ago. This is an unsolved problem, however, and all departments of trade will move slowly and be governed more or less by developments along the lines mentioned, and, when final results are obtained, values in Iron and Steel may be fixed with more certainty than is possible at the present time. Sales have been very light during the past week, and prices are undoubtedly easier, without being very much lower. Premiums for early deliveries, however, have practically vanished, and quotations made for the third quarter include a certain proportion for July, which is practically spot Iron. For that month alone the outside figure might be quoted, but buyers can get Iron without much effort at fairly uniform prices for almost any delivery they may require. No. 2 X Foundry for the usual points of delivery during the third quarter can be bought at \$24 to \$25, and for the fourth quarter at \$23 to \$23.50. Gray Forge commands \$22.50 to \$22.75 for third quarter, and \$22.25 to \$22.50 for last quarter. Middlebrough Iron is somewhat uncertain, and is not in demand unless at considerably less money than was recently paid. Several cargoes will be due here inside the next 30 days, but nearly all the Iron is sold to arrive to the Pipe or other large foundries. Basic Iron is rather scarce for prompt deliveries, and would probably command \$23.50 to \$24 for the third quarter, and about \$23 for the fourth quarter. There is some resale Iron for the last quarter, which may perhaps be sold at a slight concession from the figure named. Low Phosphorus has been taken in lots of 200 to 300 tons up to one lot of 4000 tons, prices ranging from \$27.50 to \$28, delivered. A bid slightly below \$27, seaboard, for foreign Iron was made, but could not be put through on that basis.

Ferroalloys.—Business is extremely quiet, although orders could be placed at low figures; say \$61 to \$62 for Ferromanganese, shipments during the last half. Prompt shipments could be done at \$64, but buyers are showing very little interest in the market at the present time.

Steel.—Business holds up fairly well, and specifications on old contracts are coming in satisfactorily. The general outlook is considered to be favorable, and prices are unchanged, at \$32.50 to \$33 for nearby deliveries of ordinary Rolling Billets and \$36 to \$38 for Forging Steel.

Plates.—The demand for Plates has been very good during the past few days. A great many contracts for deliveries to be made during the last half of the year are being placed and from present appearances there is little prospect of any falling off from the tonnage which has been taken during the first half of the year. Prices are steady and may be quoted as follows:

	Carload. Cents.	Part carload. Cents.
Tank, Bridge and Boat Steel.....	1.85	1.90
Flange or Boiler Steel.....	1.95	2.05
Marine.....	2.20	2.25
Locomotive Firebox Steel.....	2.40	2.45
The above are base prices for 1/4-in. and heavier. The following extras apply:		
3-16-in. thick.....		\$0.10
Nos. 7 and 8, B. W. G.....		.15
No. 9, B. W. G.....		.25
Plates over 100 to 110 in.....		.05
Plates over 110 to 115 in.....		.10
Plates over 115 to 120 in.....		.15
Plates over 120 to 125 in.....		.25
Plates over 125 to 130 in.....		.50
Plates over 130 in.....		1.00

Structural Material.—There is not much change in this department. Work is not rushing in, and mills can make fairly prompt shipments of almost anything, but prospects are thought to be good for the later months of the year as there is a great deal of work in sight. The chances for taking it up quickly seem to be favorable, and there is little doubt that the mills will have plenty of work during the remainder of the year. Prices are steady at 1.85c. to 2c for Beams, Angles and Channels, according to specification.

Bars.—A good volume of business has been taken and mills seem to be pretty well assured of full employment during the next several months. Prices are firm, at 1.85c., for Best Refined Iron and the same to a tenth more for Steel Bars, which command a premium for early shipments.

Sheets.—The demand is well maintained and gives full employment to all the leading mills. Prices are as follows

for carload lots, with the usual additions for small lots; Nos. 18 to 20, 2.80c.; Nos. 22 to 24, 2.90c.; Nos. 25 to 26, 3c.; No. 27, 3.10c., and No. 28, 3.20c.

Old Material.—The market is in a very unsettled condition, and prices are difficult to quote with exactness. The demand has dropped off, so that there is hardly any market in the usual sense of the word. Steel has sold at \$18.75, but bids are not over \$18 to \$18.25 now, and even then consumers are liable to change their position over night. Other material is similarly affected, but bids and offers for deliveries in buyers' yards are about as follows, but, as said before, they are subject to revision on short notice:

Steel Crops and Rails.....	\$19.00 to \$19.50
No. 1 Steel Scrap.....	18.25 to 18.75
Low Phosphorus.....	24.50 to 25.00
Old Steel Axles.....	21.50 to 22.00
Old Iron Axles.....	30.00 to 31.00
Old Iron Rails.....	27.00 to 28.00
Old Car Wheels.....	25.00 to 25.50
Choice No. 1 R. R. Wrought.....	20.00 to 21.00
No. 1 Yard Scrap.....	18.00 to 19.00
Long and Short.....	18.50 to 18.75
Machinery Scrap.....	20.00 to 21.00
Wrought Iron Pipe.....	16.75 to 17.00
No. 1 Forge Fire Scrap.....	16.50 to 17.00
No. 2 Light.....	11.00 to 12.00
Wrought Turnings.....	16.75 to 17.25
Heavy Machinery and Axle Turnings..	17.25 to 17.75
Stove Plate.....	17.50 to 18.00
Cast Borings.....	16.00 to 16.50
Grate Bars.....	16.50 to 17.00

Cleveland.

CLEVELAND, OHIO, June 25, 1907.

Iron Ore.—There is no falling off in the heavy movement of Ore which has been going on the entire month, and the predictions of the June shipments have passed beyond the 6,000,000-ton mark, which was the estimate of the month's shipments made a few weeks ago. Shippers now predict that the June shipments will reach 6,300,000 tons and some are placing the tonnage as high as 6,500,000 tons. Up to the present time the record breaking month for the movement of Ore was July of last year, when the fleet moved 5,762,772 tons from the upper lake ports. Dispatch in the Ore trade has been very good and the vesselmen are now pretty well up on their contracts. Ore shippers are taking about all tonnage that is offered, but there are few wild boats on the market and chartering is light. Ore in large quantities is still being taken from the stock piles at the upper lake ports, shippers preferring to get the Ore down early rather than to take chances on having it moved later in the season. For making a big record month the situation could hardly be more satisfactory than it is at present. The only complaint that the shippers have at present is the car shortage, which is more serious than it was a few weeks ago. A great deal of Ore that would otherwise be rushed forward direct to the furnaces is being dumped from the boats on the stock piles, because cars are not available, and the shippers and vesselmen do not want to delay the boats in waiting for cars. The Coal movement is also very heavy. The Ore market is quiet, but prices are firm. There is only an occasional inquiry for a small lot. Ore prices are unchanged, being as follows at Lake Erie docks, per gross ton: Old Range Bessemer, \$5; Mesaba Bessemer, \$4.75; Old Range Non-Bessemer, \$4.25; Mesaba Non-Bessemer, \$4; Siliceous Bessemer, \$2.75; Siliceous Non-Bessemer, \$2.35 to \$2.60.

Pig Iron.—The market has settled down to a state of inactivity. With furnaces well sold up for the balance of the year and the foundrymen well covered for the same period the market is expected to remain quiet for the next few weeks. No sales are reported of Northern Foundry Iron either for spot delivery or for the balance of the year. A few foundries have made purchases during the week for the first quarter and first half of 1908 delivery at \$21.50 and \$22, Valley furnace, for No. 2 Northern Foundry, which seems to be the established price at present for those deliveries. The most of the foundries seem disposed, however, to wait until later to buy their Iron for next year's delivery, and furnaces are in no hurry to sell. While the situation is a little easier, it can hardly be said that prices are any weaker, although there are no sales on which to base the present condition of the market. There is, however, less talk of a shortage of Iron during the latter part of the year. While some foundries will need more Iron during the third and fourth quarter it is believed that the output of the furnaces that is not already contracted for will be sufficient to supply them. We quote Northern No. 2 Foundry for the third quarter at \$24 to \$25, Valley furnace; \$23, Valley furnace, for the fourth quarter, and \$24 for the last half. The sale of a small lot of No. 3 Middlesbrough is reported at \$24.50, delivered, for prompt delivery, the price being 50 cents lower than was paid the previous week. There is as yet very little demand for Southern Iron for next year's delivery. The price quoted is \$18.50, Birmingham, for first half delivery. Basic Iron remains firm. One small sale is noted during the week at \$23.50, Valley furnace, for spot delivery. Quotations for the last quarter of 1907, f.o.b. Cleveland, are as follows:

Bessemer.....	\$23.50
Northern Foundry, No. 1.....	\$24.00 to 24.50
Northern Foundry, No. 2.....	23.50 to 24.00
Northern Foundry, No. 3.....	23.00 to 23.50
Southern Foundry, No. 2.....	24.35 to 24.85
Gray Forge.....	22.50

Coke.—Furnace Coke for spot shipment is stronger, and is now quoted at \$2.50 to \$2.60, at oven. Some sales are reported at the former price. We quote Furnace Coke for last half delivery at \$2.90, at oven. Foundry Coke for last half delivery is in fair demand, a number of foundries having made contracts during the week, the ruling price being from \$3.15 to \$3.25, at oven, although one interest reports sales at \$3.50. Foundry Coke for spot delivery is held at the same prices as for the last half.

Finished Iron and Steel.—While a large volume of new business has not been booked during the week, there has been a fair demand for all kinds of Finished Material, and the general situation continues very satisfactory. Orders have been placed for Plates for two additional boats for the American Shipbuilding Company, although it is announced that the contracts for the boats have not yet been closed. Each boat will require 2750 tons of Plates. This makes six lake freighters that are practically under contract for next season's delivery, contracts for four boats having been closed during the previous two weeks. The demand for Plates is as strong as ever, and among other smaller contracts closed one mill reports one sale of 3000 tons of Plates. The premium business in Plates continues good, and mills report no trouble in getting orders at a premium of from \$1 to \$4 a ton for prompt shipment. For future delivery Plates are quoted at 1.80c., Cleveland, but one mill that promises quick delivery after specifications are filed is booking orders at 1.80c. to 1.90c., Pittsburgh. Some mills can make deliveries on Universal Plates in two to three weeks and on Sheared Plates in six to eight weeks. The Steel Bar situation is easier, but not much if any improvement is noted in deliveries. Steel Bars for future delivery are quoted at 1.70c., Cleveland, for car lots. There is very little premium business in Steel Bars, because mills that can make quick shipment want about the same prices as the jobbers. There is only a fair demand for Iron Bars. They are quoted at 1.70c., Pittsburgh, or 1.80c., Cleveland, but good sized orders can be placed at 1.65c., Pittsburgh. The best deliveries of Iron and Steel Bars are still from two to three months. The demand for Steel specialties continues heavy. One Steel Bar contract for 2000 tons was closed during the week. Billets are still in fair demand. Forging Billets are quoted at \$34 to \$36, base, at mill, and Re-rolling Billets at \$31, Pittsburgh. The demand for Structural Material continues fair. The sale of 1000 tons to a local fabricating plant is reported. There are inquiries in the market for about 1000 tons of concrete Bars for piling for a bridge in Toledo, Ohio, and for 800 tons of second quality of Standard Section Rails for a coal mining company. The only Rail sale reported is one lot of 100 tons of Light Rails for a coal mine. Specifications continue to come in satisfactorily, but little improvement is noted in deliveries. Warehouse business is still good, although not so heavy as a few weeks ago. No change is noted in stock prices. Steel Bars are selling at 1.95c., out of stock, and Iron Bars at 2c. Warehouse prices on Sheets are as follows: Blue Annealed, No. 10, 2.30c.; No. 28 One Pass Cold Rolled, 3.05c.; No. 28 Galvanized, 4.05c. The stock price on Boiler Tubes, 2½ to 5 in., is 64 per cent. discount, and on Black Merchant Iron Pipe, base sizes, 67 per cent. discount.

Old Material.—The market is very quiet. Cast Scrap is still in fair demand, but there are few inquiries for other grades of Old Material. Many mills have ordered a suspension on shipments on contract because of the shutdown on July 1, and this, it is expected, will have the effect of slightly weakening prices, although no change is as yet noted. There is a fair supply of Old Material on the market. Dealers do not look for greater activity for two or three weeks. Dealers' prices to the trade per gross ton, f.o.b. Cleveland, are as follows:

Old Steel Rails.....	\$16.75 to \$17.00
Old Iron Rails.....	24.00 to 25.00
Steel Car Axles.....	22.50 to 23.00
Old Car Wheels.....	23.00 to 23.50
Relaying Rails, 50 lb. and over.....	29.00 to 31.00
Relaying Rails, under 50 lb.....	31.00 to 32.50
Heavy Melting Steel.....	16.50 to 17.50
Railroad Malleable.....	18.75 to 19.25
Agricultural Malleable.....	15.50
Light Bundled Sheet Scrap.....	15.50 to 16.50

The following quotations are per net ton, f.o.b. Cleveland:

Iron Car Axles.....	\$26.00 to \$27.00
Cast Borings.....	10.50 to 11.00
Iron and Steel Turnings and Drillings..	12.50 to 13.00
No. 1 Bushing.....	14.50 to 15.00
No. 1 Railroad Wrought.....	16.50 to 17.00
No. 1 Cast.....	19.00 to 20.00
Stove Plate.....	15.00 to 15.50
Bundled Tin Scrap.....	15.00 to 16.00

Joseph Nagusky & Co. have opened offices at 603 New England Building, Cleveland, and will deal in Iron and Steel Scrap.

Pittsburgh.

PARK BUILDING, June 26, 1907.—(By Telegraph.)

Pig Iron.—There is a little more inquiry, and it is believed that early in July there will be some buying. A local Steel concern has bought about 5000 tons of Bessemer that was originally intended for Eastern shipment, deliveries running over July, August and September. Aside from this iron, which was unexpectedly available, there is very little Bessemer to be had for third quarter delivery, and the market is firm at \$23.25 to \$23.50, Valley furnace, or \$24.15 to \$24.40, Pittsburgh. There is a good deal of Basic Iron pressing for sale, and prices are weak. Basic in fairly large tonnages has been offered as low as \$23, Valley furnace, but on a firm offer it is probable that it could be bought at \$22.50 or \$22.75, Valley furnace. There is not much doing in Foundry Iron, sales being mostly of small lots. We quote Northern No. 2 Foundry in small lots for prompt delivery at \$25 to \$26; for third quarter, \$23 to \$24, and for last half, \$22.50 to \$23, Valley furnace. We may note, however, that some furnaces are asking from 50c. to \$1 a ton higher than these prices, and are able to sell small lots at the higher figure. Forge Iron is very quiet, and we quote Northern makes at \$22.25, Valley furnace, or \$23.15, Pittsburgh.

Steel.—The Carnegie Steel Company has notified its customers that buy Sheet and Tin Bars on quarterly contracts that the price for July, August and September will be \$31, Pittsburgh, which is an advance of \$1 over the price charged for the present quarter. There is considerable inquiry for Axle Billets, but with two or three concerns actively competing for this business prices are a shade easier. It is probable that on a large tonnage and for delivery over the last of the year Axle Billets could be bought at close to \$33, Pittsburgh. We quote Sheet and Tin Bars in random lengths at \$31, maker's mill, and Axle Billets at \$33 to \$34, depending on tonnage and deliveries. We quote Bessemer Billets at \$29.50 and Open Hearth at \$31 to \$31.50, f.o.b. Pittsburgh.

(By Mail.)

There has been heavier buying in the past week in finished lines of Iron and Steel than for some time, and indications are that the almost phenomenal activity of the mills will continue through the summer months, with the exception that some plants will close down for necessary repairs and inventory. These shutdowns will be made as brief as possible, owing to the crowded condition of order books and the fact that consumers are clamoring for prompt shipments. The very favorable weather of the past two weeks has also had the effect of bringing out a good deal of tonnage in various lines that was being held back. Some large contracts for Plates, Structural Shapes and Pipe have been placed, while the new business in Sheets and Bars continues heavy. The situation in the Pig Iron market is quiet, but as pointed out before this is due largely to the fact that the blast furnaces are sold up, and there is little Iron to sell over the next two or three months. Prices on Bessemer and Basic Iron are fairly firm, but practically no tonnage of any moment has been sold for two weeks or more. While the supply of Steel is better, prices are firm, the Carnegie Steel Company having notified some of its customers that buy Sheet and Tin Bars on contracts of an advance of \$1 a ton for July, August and September shipment. There is some inquiry in the market for Billets and Sheet and Tin Bars, and also for Axle Billets for last half of the year delivery, and considerable tonnage is expected to be placed in the next week or two. The outlook as regards settlement of the various wages scales, which expire on June 30, is very good, and it is not believed there will be any interruption of operations this year, on account of labor troubles. The Sheet and Tin Plate scales have already been arranged with the American Sheet & Tin Plate Company, and this means that the scale adopted will also be signed by the independent Sheet and Tin Plate mills. At this writing, a conference is being held in Detroit between the Amalgamated Association and the Western Bar Iron Association, at which it is expected that the scale for puddling and finishing mills will be arranged.

Ferromanganese.—There is considerable inquiry for Ferro for July and August delivery, and also one or two inquiries for fairly large lots for delivery over the balance of this year. We note sales of about 100 tons of foreign 80 per cent. English Ferro for July and August shipment at \$63.50 to \$64, Pittsburgh. For delivery over August and September, \$63 to \$63.50, Pittsburgh, is being asked, and for delivery over last half of the year about \$62.50 is being quoted.

Muck Bar.—There has been more inquiry for Muck Bar in the past week than for some time, and we note a sale of 1000 tons of Bar made from all Pig Iron at \$38, Pittsburgh. The market is reported as firm at this price.

Skelp.—A very large tonnage of Sheared Skelp has been sold in the past week for delivery over the next three months, and the Skelp mills are filled with orders for some time and are not quoting for shipment prior to October. Prices are

very firm and for forward delivery we quote: Grooved Steel Skelp, 1.90c. to 1.95c.; Sheared Steel Skelp, 1.90c. to 2c.; Grooved Iron Skelp, 2.20c. to 2.25c., and Sheared Iron Skelp, 2.30c. to 2.35c., these prices being f.o.b. maker's mill.

Rods.—There is a good deal of inquiry for Rods, and some tonnage in Basic Rods has been sold, while more is under negotiation. We note sales of about 2000 tons of Basic Open Hearth Rods at \$37.50, Pittsburgh. We quote Bessemer Rods at \$36.50 to \$37, and Basic Open Hearth Rods at \$37.50 to \$38, Pittsburgh.

Steel Rails.—The local condition in Steel Rails is rather quiet, the Carnegie Steel Company having entered last week orders for only 14,000 tons of Standard Sections and about 3000 tons of Light Rails. New tonnage in Light Rails is quite large, and the company is pretty well filled up for the balance of this year. We quote Light Rails as follows: \$33 to \$34 for 20 to 45 lb.; \$34 to \$35 for 16-lb., and \$35 to \$36 for 12-lb., at mill. Angle Splice Bars are held at 1.65c., and Standard Section Rails at \$28, at mill.

Plates.—Orders for a good part of the Plates and Shapes for Ore boats, referred to in this report last week, has been placed, the Carnegie Steel Company having received contracts from the American Shipbuilding Company, Cleveland, for 12,000 to 13,000 tons for four boats and a contract from the Great Lakes Engineering Works, Detroit, for about 10,000 tons for three boats. Other business is coming up, and on both Universal and Sheared Plates, and the engagements of the Carnegie Steel Company will take practically its entire output for the balance of this year. The other Plate mills are also well filled, but some of the smaller concerns can make deliveries in three to four weeks, for which they are able to get premiums of \$1 to \$2 a ton over regular prices. The La Belle Iron Works, at Steubenville, is building a new three-high 72-in. Plate mill which is expected to be in operation in October. We quote: Tank Plates, 1/4-in. thick, 6 1/4 in. up to 100 in. wide, 1.70c. to 1.80c., base, at mills, Pittsburgh. Extras over this price are as follows:

	Extra per 100 lb.
Gauges lighter than 1/4-in. to and including 3-16-in.	
Plates on thin edges.....	\$0.10
Gauges Nos. 7 and 8.....	.15
Gauge No. 9.....	.25
Plates over 100 to 110 in.....	.05
Plates over 110 to 115 in.....	.10
Plates over 115 to 120 in.....	.15
Plates over 120 to 125 in.....	.25
Plates over 125 to 130 in.....	.50
Plates over 130 in.....	1.00
All sketches (excepting straight taper Plates varying not more than 4 in. in width at ends, narrowest end being not less than 30 in.).....	.10
Complete Circles.....	.20
Boiler and Flange Steel Plates.....	.10
"A. B. M. A." and ordinary Firebox Steel Plates.....	.20
Still Bottom Steel.....	.30
Marine Steel.....	.40
Shell Grade of Steel is abandoned.	

TERMS.—Net cash 30 days. For anticipated payments a maximum discount may be allowed at the rate of 6 per cent. per annum and for a longer time than 30 days interest shall be charged at the same rate per annum. Invoices paid within 10 days from date thereof, discount of 1/2 of 1 per cent. is allowable. Pacific Coast base, 1.60c., f.o.b. Pittsburgh, with all rail tariff rate of freight to destination added, no reduction for rectangular shapes 14 in. wide down to 6 in. of Tank, Ship or Bridge quality.

Structural Material.—Inquiries have been much better, a good deal of tonnage has been placed and more is in sight. In addition to the 8000 tons of bridge work for the Great Northern taken by the American Bridge Company, we note that the Chicago, Burlington & Quincy, Rock Island, and other Western roads are in the market for considerable quantities, most of which is expected to be placed early in July. The McClintic-Marshall Construction Company has taken about 800 tons for a bridge at Parkersburg, W. Va., and about 1000 tons for a viaduct for the New York, Ontario & Western. Deliveries by the mills are not satisfactory, as they have a large tonnage ahead on their books, and are not making as prompt shipments as customers desire. We quote: Beams and Channels, up to 15 in., 1.70c.; over 15 in., 1.80c.; Angles, 3 x 2 x 1/4 in. thick up to 6 x 6 in., 1.70c.; 8 x 8 and 7 x 3 1/2 in., 1.80c.; Tees, 3 in. and larger, 1.70c.; Tees, 3 in. and larger, 1.75c. Under the Steel Bar card Angles, Channels and Tees under 3 in. are 1.70c., base, for Bessemer and Open Hearth, subject to half extras on the Standard Steel Bar card.

Sheets.—The new demand for both Black and Galvanized Sheets continues heavy, and on the latter consumers are having great trouble in finding mills that are in position to make deliveries wanted. The leading interest is operating to full capacity, but on Galvanized and Special Grade Sheets is from four to five months behind in shipments, being practically filled up for the rest of the year. An advance in Galvanized Sheets of about \$2 a ton is looked for by the trade on account of the heavy demand, and the higher price of Spelter. The fact that outside Sheet mills will pay \$31 for Sheet Bars for third quarter delivery precludes any possibility of a decline in the price of Sheets during that period at least. We quote: Blue Annealed Sheets, No. 10 gauge and heavier, 1.85c.; Nos. 11 and 12, 1.90c.; Nos. 13 and 14, 1.95c.; Nos. 15 and 16, 2.05c.; Box Annealed, Nos. 17 to 21, 2.35c.; Nos. 22 to 24, 2.40c.; Nos.

25 and 26, 2.45c.; No. 27, 2.50c.; No. 28, 2.60c.; No. 29, 2.75c.; No. 30, 2.85c. We quote Galvanized Sheets as follows: Nos. 10 and 11, 2.65c.; Nos. 12 and 14, 2.75c.; Nos. 15 and 16, 2.85c.; Nos. 17 to 21, 3c.; Nos. 22 and 24, 3.15c.; Nos. 25 and 26, 3.35c.; No. 27, 3.55c.; No. 28, 3.75c.; No. 29, 4c., and No. 30, 4.25c. We quote No. 28 gauge Painted Roofing Sheets at \$1.85 per square, and Galvanized Roofing Sheets, No. 28 gauge, \$3.25 per square, for 2-in. corrugations. These prices are for carload lots, jobbers charging the usual advances.

Hoops and Bands.—Some contracts are being made for delivery for last half of the year, and at full prices. For prompt shipment, buyers are still sometimes compelled to pay premiums of \$1 to \$2 a ton over regular prices for forward delivery, which are as follows: Steel Hoops, 2c., and Bands for all purposes at 1.60c., base, half extras, as per Standard Steel card. These prices are for carload lots, f.o.b. Pittsburgh, plus full tariff rail rate to point of delivery, an advance of \$2 a ton being charged for less than carloads.

Cotton Ties.—Practically all of the large tonnage of leading consumers for this year delivery has been placed at the agreed price of 95c. a bundle. For scattering small orders an advance over this price would be charged after July 1.

Tin Plate.—The very favorable weather of the past few weeks and the assurance that the fruit crop, while later this year than usual, has not been seriously damaged, have started some inquiry for Bright Plate for the canning interests for last quarter delivery, and it is expected that during July considerable business will develop. The Tin Plate mills are pretty well filled through the third quarter, but as yet have not much on their books for the last quarter. We quote \$3.90 for 100-lb. Cokes, f.o.b. Pittsburgh, for 14 x 20 100-lb. Cokes, terms 30 days, less 2 per cent. off for cash in 10 days, on which price a rebate of 5c. a box is allowed for carload and larger lots.

Bars.—Most of the large buyers of Steel Bars have closed, but there is a steady flow of small orders, and the three leading makers now have an enormous tonnage on their books for delivery over the second half of this year and into the first half of next year. The fact that the Amalgamated wage scale for puddling and finishing mills has not been settled is not causing much concern, as it is fully expected these scales will be arranged within the next week with the Western Bar Iron Association and also with the Republic Iron & Steel Company. A fairly heavy tonnage is being placed in Iron Bars and the mills have a good deal of work on their books. We quote Refined Iron Bars at 1.70c. to 1.75c., Pittsburgh, and Steel Bars for forward delivery at 1.60c., base, half extras, f.o.b. Pittsburgh.

Spelter.—The market is only fairly strong, and buying is rather light. We quote prime grades of Western Spelter at 6.35c., St. Louis, equal to 6.47½c., Pittsburgh, but on a firm offer and for large tonnage this price might be shaded.

Merchant Steel.—The demand for seasonable Steels is fairly active, but on the other grades is light. The mills have booked a great deal of new business in the past month from implement makers and wagon builders for deliveries extending over the next year from July 1. We quote: Smooth Finished Machinery Steel, 1.85c. to 2c., depending on quality; Flat Sleigh Shoe, 1.65c. to 1.75c.; Cutter Shoe, 2.15c. to 2.20c.; Toe Calk Steel, 2.10c. to 2.15c.; Railroad Spring Steel, 1.75c. to 1.80c.; Crucible Tool Steel, 6c. to 8c., for ordinary grades, and 10c. and upward for special grades. We quote Cold Rolled Shafting at 50 per cent. off in carloads, and 45 per cent. in less than carloads, delivered in base territory.

Railroad Spikes.—The railroads have placed considerable tonnage for the last half of the year, and inquiries are in the market which are expected to be given out early in July. We quote standard sizes at \$2.15 to \$2.20, but note that the lower price is named only by one or two mills and for desirable orders. We quote small sizes at \$2.40 to \$2.50 per 100 lb.

Merchant Pipe.—The National Tube Company has taken a contract from the Columbia Gas & Electric Company for 190 miles of 16 and 20 in. Line Pipe for delivery in the latter part of this year. The line is to be used for taking natural gas from the West Virginia gas fields to Cincinnati. Specifications and orders for Pipe continue to come in at a rate equal to or in excess of output, and the leading Pipe mills are not catching up on deliveries to any extent. The tonnage in Pipe this year is simply enormous, and is away beyond the expectations of the mills and their ability to supply promptly. Discounts on Steel Pipe are as follows:

Merchant Pipe.		Jobbers, carloads.	
		Black.	Galv.
1/4 to 1/2 in.	.....	65	49
3/4 in.	.....	67	53
1 in.	.....	69	57
1 1/4 to 6 in.	.....	73	63
7 to 12 in.	.....	70	55

Extra strong, plain ends:

1/2 to 3/4 in.	.....	58	46
3/4 to 4 in.	.....	65	53
4 1/2 to 8 in.	.....	61	49
Double extra strong, plain ends:			
3/4 to 8 in.	.....	54	43

All above discounts are subject to 1 point on the base and 5 per cent. on the net.

Official discounts on Iron Pipe, which are shaded one-half point or more to the large trade, are as follows, f.o.b. Pittsburgh:

Standard Genuine Iron Pipe.

	Black.	Galv.
3/4 to 6 in.	67
1/2 in.	62
1 in.	60
1 1/4 and 1 1/2 in.	58
7 to 12 in.	62

Extra Heavy Iron Pipe, Plain Ends.

1/2, 3/4 and 1 in.	.....	62	40
1 1/4 to 4 in.	.....	59	47
4 1/2 to 8 in.	.....	55	42

Boiler Tubes.—Many contracts on both Locomotive and Merchant Tubes will expire July 1, and consumers are specifying liberally against these contracts, with the result that shipments by the mills this month have been unusually heavy. A number of the leading railroads have their requirements of Boiler Tubes made up for last half of the year, but for various reasons these are being held up, although they are expected to come out during July. The mills are well filled, and consumers occasionally have to pay slight premiums for prompt shipments. Official discounts are as follows:

Boiler Tubes.

	Iron.	Steel.
1 to 1 1/2 in.	42
1 1/2 to 2 1/4 in.	42
2 1/2 in.	47
2 3/4 to 5 in.	52
6 to 13 in.	42
2 1/2 in. and smaller, over 18 ft. long, 10 per cent. net extra.		59
2 1/2 in. and larger, over 22 ft. long, 10 per cent. net extra.		

Iron and Steel Scrap.—The general market is quiet, due largely to the fact that on July 1 quite a number of plants will close down for repairs and inventory and pending the settlement of wage scales, and therefore do not want to take in Scrap until these matters have been arranged. Prices are reasonably firm, and it is believed a better buying movement will develop early next month. Dealers quote as follows: Heavy Steel Scrap, \$18.25 to \$18.50, for Pittsburgh, Steubenville and Sharon delivery, prices depending on quality; No. 1 Railroad Wrought Scrap, \$18.75 to \$19, and No. 2, \$18.25 to \$18.50; Bundled Sheet Scrap, \$16.75; No. 1 Busheling Scrap, \$18 to \$18.25; No. 2 Busheling Scrap, \$15 to \$15.25; Old Steel Rails, short pieces, for Open Hearth purposes, \$18.50 to \$19; Old Steel Rails, rollers, \$20; Low Phosphorus Melting Stock, \$22.50 to \$23; Cast Iron Borings, \$14.25 to \$14.50; Stove Plate, \$16.50 to \$16.75; Old Car Wheels, \$26 to \$26.25; Steel Axles, \$21.75 to \$22; Grate Bars, \$16.25 to \$16.50; No. 1 Cast Scrap, \$21.50 to \$21.75; all above prices are per gross ton, f.o.b. Pittsburgh.

Coke.—There is no betterment in conditions in the Coke trade as regards prices, which for Furnace Coke for spot shipment continue low. Reports in the daily press that the Frick Coke Company was buying heavily for this and next year's delivery are absolutely untrue, this concern not having bought any Coke in the open market for three months or more. It is also untrue that the company has shut down or will lay off 3000 ovens to restrict output. Up to this time the company has laid off 356 ovens which were located at works at which the coal supply has been exhausted, and it was thought better to stop these ovens and save the coal which was being shipped from other points, rather than put it into Coke at the low prices ruling. There seems to be only one remedy by which the market can be improved, and this is for some of the independent operators who have no furnace connections to cease production and reduce the supply of surplus Coke that is on the market and is being sold at ruinous prices. Connellsville Furnace Coke for spot shipment continues to sell as low as \$1.90 to \$2 a ton at oven. We do not hear of any important contracts for Coke being made for last half of the year, consumers having decided to buy from month to month while the present low prices last. The output of Coke in the Upper and Lower Connellsville regions last week amounted to 421,157 tons.

The firm of R. L. Ginsburg & Sons, dealers in iron, steel and metals, Detroit, Mich., and Buffalo, N. Y., will be succeeded July 1 by a corporation to be known as the R. L. Ginsburg Sons Company, with offices located as heretofore. The new corporation will take over all the assets and liabilities of the present firm. Solomon Ginsburg, Buffalo, is to be president; Bernard Ginsburg, Detroit, vice-president and treasurer, and Oscar C. Schimmel, Detroit, secretary.

Trade Publications

Blowers and Fans.—Emerson Electric Mfg. Company, St. Louis, Mo. Two bulletins. No. 3304, superseding No. 3301, pertains to direct connected electric forge blowers for direct and alternating currents, including those for operating one, two and one or more forges. No. 3503, superseding No. 3502, is devoted to direct connected electric exhaust fans for direct and alternating currents. Data and list prices are given of the 12 and 18 in. Emerson exhaust fans with Parker blades, and the Davidson exhaust fans with Emerson motors of the 12, 18 and 24 in. sizes.

Concrete Block Machines.—Ideal Concrete Machinery Company, South Bend, Ind. Catalogue. Size 8 x 10 in.; pages 170. Illustrates and describes the Ideal concrete machines for the manufacture of concrete building blocks, which are claimed to combine strength, beauty, economy and sanitation. They are fireproof, warm in winter and cool in summer. Instructions are given for operating the machines, and photographs show the various stages in the production of a block, also the parts of the 8, 10 and 12 in. block machines and the model A brick machines. Half-tones illustrate the various types and sizes of blocks manufactured on these machines, and line drawings show the construction of pier or column blocks, wall construction by different types of Ideal blocks, &c.

Concrete Piling.—Raymond Concrete Pile Company, 135 Adams street, Chicago, Ill. Catalogue. Size 6 x 9 in.; pages 76. Illustrates and describes the Raymond system of concrete piling, the method of which is as follows: A collapsible steel pile core is encased in a thin, closely fitting sheet steel shell, and both are driven to the required depth by means of a pile driver. The core is then withdrawn, leaving the shell or casing in the ground to be filled with carefully mixed Portland cement concrete, which is tamped during the filling process. Illustrations show various building foundations of Raymond piles. Testimonials from those who have had practical use of these piles, and an article on "Concrete Piles at the United States Naval Academy, Annapolis, Md.," by Walter R. Harper, inspector in charge of the Academy group, are included.

Mechanical Draft System.—Hanchett Hot Blast Grate Company, Big Rapids, Mich. Circulars. Illustrates and describes a new mechanical draft system and an improved hot blast grate, which solves the problem of burning wet sawdust and mill refuse and increases the steaming power of boilers 25 to 50 per cent. It is claimed that by this system a saving is obtained in the first cost of a boiler installation and a saving of labor in firing.

Valves and Tube Cleaners.—Liberty Mfg. Company, 6010 Susquehanna street, Pittsburgh, Pa. Circulars. One pertains to the Faber blow-off valves, with either flanged or screwed ends, and the other to the Liberty standard tube cleaner, which is claimed to be cheap in operation and efficient and durable.

Electrical and Steam Machinery.—John A. Stewart Electric Company, Fifth and Sycamore streets, Cincinnati, Ohio. Special list of new and second-hand electrical and steam machinery, consisting of loose leaves letter size. Lists machinery which is in stock ready for quick delivery, and is subject to change from day to day. Whenever changes are made on any one of the sheets a new sheet is inserted, and the list is always kept up to date. It also calls attention to the company's desire to purchase any apparatus which is to be superseded or discarded by its owners.

Conveying and Transmission Machinery.—Stephens Adamson Mfg. Company, office First National Bank Building, Chicago; works Aurora, Ill. Volume 2, No. 4, of monthly pamphlet entitled *Conveying and Transmission*. Illustrates belt conveyors for dredge work, crusher elevators, and also a special design of ore bin hoppers and gates. A line of double drum car pullers designed for plant switching purposes is illustrated by half-tone and line engravings. The pamphlet also contains the standard steel classification showing the graduation of extra charge above base.

Sawmill Machinery.—American Sawmill Machinery Company, Hackettstown, N. J. Catalogue No. 14. Size, 5 x 7 in.; pages, 112. Illustrates and describes the American sawmills, made in various types and sizes; details of attachments and equipment; gang edgers; hand edgers; two-saw trimmers; log handling apparatus; shingle machines, mills and jointers; bolters; lath machines and trimmers, drag saws, &c. Useful information and price-lists are included, and a complete index is appended.

Paper Pinions.—British Insulated & Helsby Cables, Limited, Prescott, Lancashire, England. Bulletin P. 42. Deals with the Prescott pinions, which are made from a special quality of high grade Manila paper. The company claims that the strength of a tooth of compressed paper made by its process is equal to that of a cast iron tooth of the same dimensions, with the advantage that it is more elastic. The maximum safe speed for these paper pinions is 3500 ft. per min. Prices of Prescott pinions with standard involute teeth and prices of blanks are included.

Electric Welding.—British Insulated & Helsby Cables, Limited, Prescott, Lancashire, England. Bulletin. Pertains to electric welding by means of the Prescott welder, which is spe-

cially designed for dealing with metal of comparatively small sections. Wires and rods may be welded of the smallest sizes up to the following maximum sizes: Iron and steel, $\frac{1}{4}$ in. in diameter; brass, 9-16 in. in diameter, and copper, $\frac{1}{8}$ in. in diameter. Bars and strips of any shape or section can also be welded, provided the sectional area does not materially exceed that of the equivalent areas for rods of the sizes given above.

Power Chains and Sprockets.—The Diamond Chain & Mfg. Company, Indianapolis, Ind. Catalogue treating of the foregoing subject. In addition to listing the company's complete line of machinery chains it gives much information on the manufacture and use of chain. A chapter on power transmission explains the advantage of chain gearing in comparison with belting, bevel gears, &c. Instructions and tables of sprocket dimensions are given which enable any manufacturer to cut the sprockets in his own shops or test the accuracy of sprockets bought outside. The chapter on care of chains includes practical hints as to how to get the most and best service from chains. Machinery chains often embody greater accuracy than the machines they drive, and should receive the same care as the other vital parts.

The Centennial of the Townsend Works at Albany.

An interesting event in the history of Albany, N. Y., is the fact that Sunday, June 16, marked the one hundredth anniversary of the establishment of the business of the Townsend Furnace & Machine Shop Company, which is now one of the city's most prominent industries. It is the oldest enterprise of its kind in the State north of the Highlands and west of the Hudson River. The local newspapers have published notes relating to the career of the company, from which the following has been compiled:

The founders of the establishment were Isaiah and John Townsend, brothers, who at the time were also conducting a wholesale tin plate, bar iron and steel store in Albany. They built a foundry fitted with an air furnace and gave notice to the public through the medium of an advertisement, dated June 16, 1807, and published in the *Albany Gazette* June 25, 1807, that the furnace was ready for business. Through all these succeeding years the term "furnace" has been carried in the name of the company. The firm was first known as Townsend & Co., changing to slightly different styles from time to time as partners died and others were admitted, but always retaining the name of Townsend. In 1896 the business was incorporated under its present name, with Franklin Townsend as president; Ledyard Cogswell, vice-president; John T. Brady, secretary and treasurer, and Ezra Loughren, superintendent. The officers at present are as follows: Ledyard Cogswell, president; Benjamin W. Johnson, vice-president; John T. Brady, treasurer; Franklin Townsend, secretary; Ezra Loughren, superintendent.

From the manufacture of pots, kettles and Franklin stoves the business of this concern developed with the requirements of the community, and from time to time the manufacture of new classes of products was introduced. It is stated that Jethro Wood, the inventor of the cast iron plowshare, had his first plowshares made in the foundry connected with these works. It is also stated that the return steam trap, invented by James H. Blessing, who was superintendent of the plant in 1868, was made there. Further, in this foundry were made some of the first chilled iron rolls for paper making and for use in rolling mills. In the early history of railroads, probably about 1840, the works built two locomotives for the Ithaca & Owego Railroad. For some years a leading source of revenue was the manufacture of the Beardslee patent wood planing machines, which were quite popular in their day. The proprietors naturally paid much attention to the equipping of flour mills and the manufacture of machinery for general purposes. Among those who were employed as millwrights was Henry Burden, who afterward became known to fame as the founder of the Burden Iron Company.

The present works of the company were built in 1870, occupying an entire block, and are thoroughly equipped in all departments. The products cover power transmitting machinery, mill gearing, steam dredges, excavators, hoisting machinery, chemical kettles, mixing mills, evaporating pans and a general variety of machine work.

New York.

NEW YORK, June 26, 1907.

Pig Iron.—There has been some buying, of mixed lots, on the part of Pipe foundries, machine shops and rolling mills, for near by delivery, at close to current market rates. The deliveries are being well taken, and in some cases melters are pushing the furnaces. We quote for spot Northern Iron, \$25 to \$25.50 for No. 1 Foundry and \$24.50 to \$24.75 for No. 2 Foundry. For the third quarter we quote \$24.50 to \$25 for No. 1 Foundry, \$23.50 to \$24 for No. 2 Foundry and \$22.75 to \$23 for No. 2 Plain. No. 2 Southern Iron is quoted \$25.75 to \$26 for spot Iron and \$25.25 to \$25.75 for the third quarter.

Steel Rails.—It is expected a meeting will be held in New York this week between Rail manufacturers and officers of important railroads to discuss changes in Rail specifications and the amount of increase in price that will fairly cover the greater discards from Rail Blooms and the other new provisions the railroads are asking for that will diminish the output of the mills. As already stated in these columns, a \$5 additional charge for Rails meeting the Pennsylvania Railroad requirements has been tentatively considered. A 15,000-ton inquiry, deliveries beginning at the end of this year, is up, the Rails to go into the Salt Lake extension of the Harriman lines. Another Western order for 5000 tons is pending, and several roads are expected to come into the market in case of the satisfactory adjustment of the questions that will come up in the important meeting appointed for to-day.

Structural Material.—The mills report that the volume of specifications is well maintained, and that new business is active, so that capacity is well occupied. Some consumers in the Pittsburgh District have recently been supplying a portion of their wants at mills in other districts, indicating that the large producers are not as well up on deliveries as was the case a few months ago. The new capacity supplied in the past 18 months has not yet made itself felt unfavorably. While all large railroad bridge contracts for 1907 have been thought to have been booked some time ago, there is yet in prospect 7000 tons for the Great Northern, this work having now been bid on a second time, and 14,000 tons for the Northern Pacific. One of these may be closed soon. In the past week the American Bridge secured 4000 tons of the bridge loop subway work, and Snare & Triest 1000 tons, the Bradley Contracting Company having the general contract. The leading interest at Pittsburgh secured 4000 to 5000 tons of Bars for the reinforced concrete work. The American Bridge Company was given the contract for the new Silversmiths' and Goldsmiths' Building on Maiden lane, requiring 2400 tons. From the Pennsylvania Railroad it has a 900-ton contract for an express building at Newark, N. J., and from the Florida East Coast a 300-ton bridge contract. The New Haven road has let 1600 tons of additional contracts for eight transfer bridges at Oak Point, Conn., and has pending 1000 tons for four bridges on the New York division. We quote as follows for tidewater deliveries, mill shipments: Beams, Channels, Angles and Zees, 1.84½c.; Tees, 1.89½c.; Bulb Angles and Deck Beams, 1.99½c. On Beams 18 to 24 in. and Angles over 6 in. the extra is 0.10c. Sales are made out of stock of material cut to length at 2¼c. to 2½c.

Bars.—The Bar Iron market continues quiet, with prices of Best Refined quotable at 1.65c. to 1.70c., Pittsburgh, or 1.81c. to 1.86c., tidewater. Steel Bars are in fair demand and are held at 1.60c., Pittsburgh, or 1.76c., tidewater, for delivery beginning three to four months hence, and 1.86c. or higher for early delivery.

Plates.—The demand for small lots is about of the usual volume, but inquiries for large quantities are lacking. No indications are yet seen of a disposition to place contracts for Sheared Plates. Quotations for tidewater delivery are as follows: Sheared Tank Plates, 1.86c. to 1.96c.; Flange Plates, 1.96c. to 2.06c.; Marine Plates, 2.26c. to 2.36c.; Fire Box Plates, 2.75c. to 3.50c., according to specifications.

Cast Iron Pipe.—The market has been somewhat more active. The American Pipe & Mfg. Company is understood to have purchased about 9000 tons from the leading interest, to be distributed among a number of the former company's water plants in different parts of the country. A Buffalo contract has also been placed, amounting to about 3000 tons. To-day the city of Hoboken, N. J., will open bids for 1650 tons. On July 3 the Department of Water Supply of New York will open bids for 5400 tons for Brooklyn and 850 tons for Manhattan. Among the promises of the future is the prospect that with an increase in the limit of the bonded indebtedness of New York more funds may be available for the Department of Water Supply, and specifications will then be issued for a large quantity of 48-in. Pipe, which may be 20,000 tons or more. While considerable inquiry is in the market, the general demand is not heavy. Prices on carload lots of 6-in. Pipe are quoted at \$36 to \$36.50 at tidewater.

Old Material.—Borings, Turnings and Heavy Melting

Steel Scrap continue in remarkably good demand. Cast Scrap and Stove Plate are a trifle easier. Railroad Wrought and City Wrought are comparatively neglected, the demand being light, while prices are perhaps a little lower. The accumulation of Old Material is small, no very considerable quantity of any kind being on hand. Large blocks of Heavy Melting Steel Scrap has been sold for future delivery, and it is expected that this will keep the market for Steel Scrap at about its present level. It is naturally to be expected that some let up will occur in the demand in the hot weather of July and August, when the mills do not run to full capacity. Quotations per gross ton, f.o.b. New York, are as follows:

Old Girder and T Rails for Melting.....	\$16.25 to \$16.75
Heavy Melting Steel Scrap.....	16.25 to 16.75
Old Steel Rails, rerolling lengths.....	18.75 to 19.50
Relaying Rails.....	27.50 to 28.00
Old Iron Rails.....	24.00 to 24.50
Standard Hammered Iron Car Axles.....	30.00 to 30.50
Old Steel Car Axles.....	20.50 to 21.00
No. 1 Railroad Wrought.....	19.50 to 20.00
Iron Track Scrap.....	17.50 to 18.00
No. 1 Yard Wrought, long.....	17.50 to 18.00
No. 1 Yard Wrought, short.....	17.00 to 17.50
Wrought Pipe.....	14.50 to 15.00
Light Iron.....	11.00 to 11.50
Cast Borings.....	12.50 to 13.00
Wrought Turnings.....	14.50 to 15.00
Old Car Wheels.....	23.00 to 23.50
No. 1 Heavy Cast, broken up.....	19.00 to 20.00
Stove Plate.....	16.50 to 17.00
Grate Bars.....	14.00 to 14.50
Malleable Cast.....	20.00 to 20.50

Metal Market.

NEW YORK, June 26, 1907.

Pig Tin.—An increased amount of business has been transacted at material advances in price. The scarcity during the week has been the feature of interest, and this resulted in a premium being demanded and paid for spot, ranging from 1½c. to 2c. per lb. On June 19, 43.25c. was bid on the New York Metal Exchange, but there were no sellers at this figure. Later in the afternoon some business was done at 43c., and Tin ex-Minneapolis, due July 1, was sold at 41.25c. On June 20, while the general asking price was 43.50c., lower prices would have been accepted. On this day Minneapolis Tin weakened slightly and was sold at 41.20c. On the following day holders of the metal apparently became frightened and actual spot Tin was offered at 42.87½c. for early delivery, while Tin from the Mesaba, which was then in port, was sold at 42.60c. The price of Tin from the Minneapolis weakened further and was sold at 41.10c. Although it is unusual for any business to be done in the Tin market on Saturday, some sales were effected at 42.50c. for spot. With the opening of the new week, however, a complete change took place, and on June 24 the price reacted and spot sold at 43c. to 43.12½c., while nearby shipments were held at 41.40c., and Minneapolis Tin at 41.25c. Even at these material advances there were very few offerings. On June 25 the price was 43.25c., and in addition there was a fair business transacted for early shipment in London at 41.90c. The corner here would, perhaps, have gone further and prices been marked up higher were it not for the fact that one of the leading consuming interests entered the market as a seller and disposed of sufficient metal to keep the price within reasonable limits. Shipments so far this month have been only fair, amounting to 2507 tons. There are afloat for American ports 2873 tons, of which but 550 tons are scheduled to arrive this month. It is believed that some revision of the figures given this month for deliveries into consumption will have to be made, as the stocks here have been very meager all the month. The domestic market is higher to-day, sales having been made at 43.75c. and 44c. The London market is easier, at £191 10s. for spot and £182 10s. for futures.

Copper.—Conditions in the Copper trade are apparently without change, a ray of hope being offered in the fact that H. H. Rogers is now on his way from Europe. The leading producers of both Lake and Electrolytic continue to adhere to the old prices, but it must be remembered that producers of Copper had a costly experience a few years past when they tried to sustain the price. They will attempt to get as high a price as they can for their wares, but it is considered extremely improbable that they will hoard any of the metal with the hope of holding prices. Consumption until recently has kept up surprisingly well and the producers have not been able to turn out as large a quantity as they had hoped. Prices are nominal, 23.50c. to 24c. being quoted for large lots of Lake, but it is related that retail lots of high grade Lake consisting of one or two casks have sold at both 24c. and 26c. on the same day. Electrolytic is quoted at 22c. to 22.75c. and Casting Grades at 21.25c. to 21.75c. Electrolytic has been freely sold in Europe at about 22c. A bona fide tender was made to the Government of high grade Lake at considerably below the foregoing figures for Lake, which tends to show the disposition in the minds of some people. The London market advanced sharply to-day but closes lower than a week ago at £97 5s. for spot, £92 10s. for futures and

£106 for Best Select. Exports have been large, amounting in all to 13,220 tons. It is believed that before the end of a fortnight the situation will be cleared and some new grounds found for basing prices.

Pig Lead.—There has been a very fair business in a retail way, but inquiries for carload lots have been few. Spot Lead can be had at 5.75c., New York, and 5.62½c. to 5.65c., St. Louis. The prices and terms of the American Smelting & Refining Company continue unchanged. In London the market is considerably easier, closing to-day at £19 12s. 6d.

Spelter.—The market is exceedingly dull, and there have been few changes in price. Spot is nominally quoted at 6.40c. to 6.50c., New York, and 6.35c., St. Louis. The London market is slightly easier, at £24 7s.

Antimony.—Despite reports of the plethora of Antimony, Hallett's is scarce, and has been sold at 13.50c. This is only temporary, however, as it can be imported from Europe at about 11c. Cookson's is purely nominal, being quoted at 13c. to 14c., although sales of a few casks have been made at materially higher figures. Other brands can be had at 11c. to 12c.

Ferroalloys.—With the filling of some large contracts which have been delayed for a number of weeks, the situation in spot Ferrosilicon has eased considerably, and the high premiums previously demanded are no longer asked. Future deliveries of 50 per cent. Ferrosilicon can be had at \$103. Prompt shipments of Ferromanganese are obtainable at \$67 to \$69, forward deliveries being held at \$64 to \$66.

Tin Plates.—Although ruling business is fair, indications are not wanting that the leading producing interests expect either a falling off in the demand during the last quarter or that their facilities will be better enabled to take care of the business. Prices are unchanged, at \$3.90, f.o.b. Pittsburgh, and \$4.09, f.o.b. New York, for 100-lb. IC Coke Plates.

Old Metals.—Copper Scrap is beginning to accumulate in the hands of dealers, and they are reluctant to accept shipments. Dealers' selling prices are easier, as follows:

	Cents.
Copper, Heavy Cut and Crucible.....	20.50 to 21.00
Copper, Heavy and Wire.....	19.50 to 20.00
Copper, Light and Bottoms.....	18.50 to 19.00
Brass, Heavy.....	14.00 to 14.25
Brass, Light.....	11.50 to 12.00
Heavy Machine Composition.....	18.25 to 18.75
Clean Brass Turnings.....	12.75 to 13.00
Composition Turnings.....	15.75 to 16.25
Lead, Heavy.....	5.12½ to 5.25
Tea Lead.....	4.75 to 4.87½
Zinc Scrap.....	5.25

Iron and Industrial Stocks.

NEW YORK, June 26, 1907.

The week has been exceedingly dull, the transactions in stocks on some days being so light as almost to establish a record in this respect. Prices have been well sustained, with a tendency toward betterment. The range of prices on leading industrials from Thursday of last week to Tuesday of this week has been as follows: United States Steel common 32½ to 34½, preferred 97½ to 99; Car & Foundry common 40 to 41½; Locomotive common 55¼ to 58¼; Steel Foundries Preferred 36½ to 37¼; Colorado Fuel 29½ to 31; Pressed Steel common 33½ to 34; Railway Spring common 41¼ to 41½; Republic common 24¼ to 25½, preferred 81 to 82; Sloss-Sheffield common 55 to 56½. Last transactions up to 1.30 p. m. to-day are reported at the following prices: United States Steel common 34½, preferred 99; Car & Foundry common 42, preferred 98½; Locomotive common 59, preferred 105; Steel Foundries common 6½, preferred 37¼; Colorado Fuel 31½; Pressed Steel common 35, preferred 88; Railway Spring common 41; Republic common 27, preferred 82; Sloss-Sheffield common 56½; Tennessee Coal 140¼; Cast Iron Pipe common 34½, preferred 80; Can common 5, preferred 54.

The Bethlehem Steel Company has sold \$2,500,000 five-year 6 per cent. notes, the proceeds to be used in improving the South Bethlehem plant. It is reported that they were sold for 94½, although confirmation of this report is not obtainable. The new plant, which is being erected, will give the company an additional capacity of about 600,000 tons a year and practically double its earning power.

Dividends.—The American Seeding Machine Company has declared a quarterly dividend of 1½ per cent. on the preferred, and 1 per cent. on the common stock, payable July 15.

The Union Switch & Signal Company, Pittsburgh, has declared a quarterly dividend of 3 per cent. on the preferred and 3 per cent. on the common stock, payable July 10.

The Empire Steel & Iron Company has declared a semi-annual dividend of 3 per cent. on the preferred stock, payable July 1.

The Westinghouse Electric & Mfg. Company has declared the regular quarterly dividend of 2½ per cent. on the

preferred, assenting and nonassenting stocks, payable July 10.

The New York Air Brake Company has declared a quarterly dividend of 2 per cent., payable July 22.

The American Shipbuilding Company has declared a quarterly dividend of 1¼ per cent. on the preferred stock.

The Tennessee Coal, Iron & Railroad Company has declared the regular quarterly dividend of 2 per cent. on the preferred stock and 1 per cent. on the common stock, both payable August 1.

The American Locomotive Company has declared a quarterly dividend of 1¼ per cent. on the preferred stock, payable July 22.

The Chicago Pneumatic Tool Company has declared a quarterly dividend of 1 per cent., payable July 25.

Labor Notes.

Many of the machinists of the Standard Machinery Company, Providence, R. I., who went out on strike recently, have returned to work, and the places of others have been filled, so that the trouble may be said to be practically at an end. This was one of the shops upon which sweeping demands were made by the Machinists' Union.

The strike at the plant of the Pope Mfg. Company, Westfield, Mass., is about over. Some of the old men have gone back to work and the places of others have been filled.

The strike in the hot mill department of the Standard Tin Plate Company, Canonsburg, Pa., has been settled. Some of the men returned to work, while the places of others have been filled, and this plant is now running to full capacity.

The molders employed in the foundries at Youngstown, Ohio, have accepted the offer of the employers for an advance of 10 cents a day, providing that the minimum rates of \$3.20 for molders and \$3.05 for core makers were not changed. The advance will be effective from July 1.

Sixty-eight riveters, the last of the original strikers at the Lorain plant of the American Shipbuilding Company, returned to work last week. This ends the strike as far as the Lorain plant is concerned. The men had been out since March 7.

The Sligo Iron & Steel Company, Pittsburgh, has filed a bill in equity at Uniontown, Pa., against the Amalgamated Association and other labor unions, stating that the defendants threatened to blow up houses occupied by the men that were willing to work, and that they also threatened the life of the superintendent of the plant of the Sligo Company. The court issued a temporary injunction restricting the defendant from interfering with the operation of the plant or with the employees.

Ventilation of Underground Works.—Theoretically a miner working under ground requires only 6½ cu. ft. of fresh air per minute for respiration, the absorption of moisture and the dilution of carbonic acid gas. This, however, assumes that all air after having been breathed is immediately removed without mixing with the surrounding atmosphere, a condition impossible to fulfill. Considering that the permissible vitiation of the air by the carbonic acid is 6 parts in 10,000, it will be found necessary to provide 66 cu. ft. of air per minute to dilute and carry away the 0.8 cu. ft. of carbonic acid produced per hour by one man. In this light it is evident that, although an average man at work breathes only about 750 cu. in. of air per minute, the amount necessary to carry away the gases given off is the really important consideration. Where explosives are used another element enters into the question, and proper provision must be made for this when determining upon the means for ventilating the workings. The problem is more difficult, of course, when all or a part of the workings are "blind"—that is, where a level is run in like a tunnel and has but the one outlet. This makes any sort of natural circulation out of the question, and requires an extensive system of piping and fans. Either the plenum or the exhaust system may be used here, the greater advantage lying probably with the former.

The Machinery Trade.

NEW YORK, June 26, 1907.

With the hot weather has come a more noticeable falling off in trade with machinery houses in this section. Because of the large business transacted up to within the past few weeks the recession is more pronounced, but it is thought not to be more than a gradual settling to a normal basis. The lessening of activity at this season of the year is not unusual, and is not necessarily an indication of a dull summer. In spite of the sudden check to further expansion of manufacturing facilities, so apparent within the past few weeks, it is believed that there are sufficient requirements, not yet covered, to constitute a good business for some time to come. A slackened demand for a short time will enable manufacturers to catch up on deliveries, and in some quarters it is thought that as soon as these ease up there will be a renewal of activity. Since our last report no large transactions have been reported, the sales generally covering small and medium sized lots of tools. A few fair sized inquiries have been received.

The increasing use of cement has brought forward a number of large cement plant projects of late, and in consequence manufacturers of power equipment have been benefited to a large extent. There are a number of large enterprises in this line just now on which contracts for engines and boilers are pending. The cement business has also helped the conveying machinery men, and from present indications the trade will derive considerable business from cement people in Pennsylvania and New Jersey, where most of the new enterprises are centered. There have been a number of Canadian cement plant propositions up of late, but most of the business with these people has been closed.

Machinery men who depend on Cuban trade for part of their income are not very enthusiastic over the prospect for business in the island in the immediate future. A well-known machinery man, who is familiar with the sugar mill trade, interviewed representatives in this city of a number of large operators of Cuban plantations and mills this week. He learned from them that they will do little in the way of extension beyond their immediate needs. It is declared that there is still considerable political unrest on the island, and until matters are cleared up satisfactorily men who are interested in sugar mill propositions say they do not care to risk investments on any large construction operations.

In a recent letter to the Department of Commerce and Labor, the Japanese Imperial Commercial Museum, Tokio, Japan, suggests that American manufacturers who desire to do business in Japan send their goods and catalogues for exhibition in the museum. This is said to be the largest and only museum under Government supervision, and affords unequalled advantages for advertising American products in that country.

Charles A. Schieren, Jr., of Charles A. Schieren & Co., New York, manufacturers of leather belting, recently returned from a trip to Europe, and while there he had a good opportunity to study industrial conditions. From the observations he made, Mr. Schieren said in an interview this week that he is of the opinion that the demand for manufacturing equipment will be quite active within the next two years at least. He found a decided disposition on the part of German manufacturers to investigate the merits of American products, and he declared that there will be plenty of business from that country for some time to come. In England there seems to be a general tendency toward patronizing home industries. The idea that England must do everything possible to maintain her commercial laurels has been actively promulgated there, and in many cases trade is given to home producers largely through sentiment. France has begun to get active in manufacturing, and has of late branched out considerably in that direction. There is a good demand for American products, and Mr. Schieren says there is a decidedly friendly spirit. The French are apparently willing to give manufacturers in this country all the chance possible to do business with them. Notwithstanding the political unrest in Russia, Mr. Schieren declared there is a large demand in that country, and the outlook there is for continued good business. The Russians seem anxious to establish closer commercial relations with this country, and the business now done there by American manufacturers is decidedly larger than it was a year or two ago. There is a good industrial boom all through Europe, Mr. Schieren said, and everything indicates that it will continue for some time.

Pennsylvania Railroad's Machinery Requirements.

Inquiries from the Pennsylvania Railroad continue to issue slowly from the purchasing department. The last lot of inquiries cover one 2-in. single bolt cutter, including nut tapping attachment, but not including taps; one horizontal automatic hollow chisel car mortising machine, belt driven, capable of taking timbers up to 12 x 14 in., and making mortises up to 2½ in. square; prices to include machine

both with and without auxiliary boring attachment, and including hollow chisels from ¾ to 1½ in.; one 32 in. drill press, to be equipped with back gears, power feed, spindles to be made for Pennsylvania Railroad standard taper shanks, machine to be complete with countershaft, wrenches, &c.; one 2000-lb. single frame steam hammer, hand driven.

The Central Railroad of Georgia is buying considerable power plant equipment, which is understood to be for installation in its proposed new shops at Macon, Ga. As the buying of a considerable quantity of power plant equipment by a railroad is usually followed by the purchase of machine tools, it will not be surprising to hear of this road coming into the market soon with a list. The company has for some time had under consideration the erection of new shops at Macon, Ga., and has secured the necessary land for the improvements. While the plans for the new buildings have not been made public, the size of the undertaking is indicated by the fact that about \$1,000,000 is to be spent for the shops and equipment. Some power equipment is also being purchased by the Southern Railroad.

Reports from Canada indicate that the railroads intend to considerably increase their shop facilities. It is stated that the Canadian Northern Railroad has decided to build new machine shops in the vicinity of Montreal. The Grand Trunk Pacific Railroad, which is being followed closely by machinery houses, has not yet laid down definite plans for its new shops, and it will probably be some time before details are completed. This latter company is rapidly building its road, and will eventually establish large repair shops.

Heine Safety Boiler Company's Proposed New Plant.

The Heine Safety Boiler Company, St. Louis, Mo., has purchased a block of ground on Marcus avenue in that city for the erection of a new plant, on which work will be begun very shortly. The tract is about 6½ acres in extent, and the company will build a plant to cost in the neighborhood of about \$300,000. The company at present has a plant on leased property on Merchant street, and this is to be abandoned when the larger plant is completed. No plans have been prepared as yet for the extension except in a general way, and the machinery details have not been gone into, although it is expected that the trade will hear of some requirements very shortly. The company's main office is in St. Louis, and it has a branch office at 11 Broadway, New York. The purchasing will be done in St. Louis.

The Cement Engineering & Construction Company, 225 Fifth avenue, New York, is planning to build a cement plant in the vicinity of Alsen, N. Y., to produce 5000 barrels a day. The company will install a power plant of 600-hp. capacity, and will purchase, it is understood, a full line of up to date cement manufacturing equipment. The company has in view plans for future extensions. The machinery details for the Alsen plan have not been settled upon.

The Ryan & Parker Construction Company, 21 Park row, New York, is purchasing machinery for a plant to be installed in connection with its quarries at Stonington, Maine, for machining all the castings it will require in carrying out its contract for the construction of the proposed Manhattan Bridge. The company will use about 2,500,000 lb. of castings. It has been found necessary for the company to machine them, because of the long time it would otherwise take to get deliveries. No power equipment will be needed, as the company has about 400 hp. installed in connection with its quarry work, and that will be ample to take care of its new requirements.

The National Foundry Company, 32 Sanford street, Brooklyn, N. Y., which was considering some time ago the erection of a plant for the manufacture of soil pipe at Birmingham, Ala., has abandoned that project for the present, and has added some property to its Brooklyn holdings. The company is now making a substantial enlargement to its Brooklyn plant, and is getting its equipment together.

The Warner Sugar Company, Shady Side, N. J., is re-vamping its boiler plant. The company has installed two Babcock & Wilcox boilers, and is equipping its entire plant with a forced draft system. Several large forced draft fans have been furnished by the Green Fuel Economizer Company, 90 West street, New York.

Johnson & Johnson, manufacturers of druggists' specialties, &c., New Brunswick, N. J., are equipping a new power plant which will include two 565-hp. batteries of Stirling boilers. The company has purchased none of its other equipment as yet.

Harvey Murdoch, 160 Nassau street, New York, has a general contract for improvements to the Long Island College Hospital, which include a power house, two stories high and about 25 x 100 ft., for which machinery is now being purchased. The power house will cost about \$26,000, and the equipment will include five Fitzgibbons vertical marine boilers of about 350 hp. capacity. Engines to match will be purchased and the requirements include other power house equipment.

The Michelin Tire Company, New Brunswick, N. J., is equipping a new plant for the manufacture of automobile tires. The company's power plant will include two batteries of Babcock & Wilcox boilers of 1100 hp. The corpo-

ration will also erect a Kellogg stack, 175 ft. high. Mr. Boreau, Milltown, N. J., has charge of the purchasing arrangements.

The Bradley Contracting Company, New York, has secured the general contract for building the subway loops in Manhattan.

Philadelphia Machinery Market.

PHILADELPHIA, PA., June 25, 1907.

The demand appears to be growing weaker for almost all classes of tools. Sales in this market recently have been confined largely to the smaller tools, and the volume of business transacted in those lines during the past week was not very heavy. The usual midsummer dullness has apparently developed. The underlying current of the trade lacks strength, and while it is reported good from a large number of sources, there are evidences of doubt as to the continuation of the active conditions which have prevailed for some time. The situation is somewhat peculiar, manufacturers in practically every case being as busy as ever and having their order books well filled. Capacities of plants are covered in some cases for six months and a plant that is not covered with enough business to carry it over the summer months is hard to find. Some anxiety, however, is shown as to where the business is to come from after that already on hand is taken care of, but as a rule there is little worry on this account at the time, as the scattered business which usually comes in during the summer will no doubt keep plants in operation for some months, even after the present rush of orders is taken care of. The machine tool dealer, however, is not so fortunately situated as the manufacturer, and any recession in business at the time will be felt by that branch of the trade first.

Inquiries are not as numerous as the trade would like. Buyers are inclined to hold back until conditions assume a more tangible shape. This is particularly noticeable in the fact that prices are being asked in some cases not with a view of purchasing, but so that figures would be available should it be finally decided at a later date to place orders. The greater proportion of the present day inquiries are for tools of the smaller sizes, those for the larger tools being few, while inquiries or specifications for any extensive equipment are practically unknown. The railroads have placed orders for practically all of their immediate requirements, and while some business will no doubt develop from these sources the volume is hardly expected to be large.

There has been no change in the foreign demand. Some scattered buying of machine tools is heard of, while a fair amount of business has been done in those of a special character. The demand for power transmission specialties continues active.

Second-hand machine tools continue fairly active, although the demand is nothing like as large as it was some months ago. Deliveries on certain classes of new tools can be had more promptly in many cases directly from dealers' stocks, and this condition has relieved the pressure for second-hand tools which recently prevailed.

A good demand for boilers and engines is to be noted. Power equipment for a number of plants has been under consideration for some little time, and several of these orders have recently been closed up. There is a fair demand for medium sized boilers and engines, although that for the smaller equipments is light, gas and gasoline engines being quite a factor in this field, sales of which are reported in fair demand, but confined largely to those of the medium capacities.

Iron and steel foundries continue busy. The demand for steel castings appears to be somewhat stronger, and in some instances advances in price on new contracts are reported. Gray iron foundries are probably not quite as hard pushed as was the case some time ago, and it is reported that orders for future business would be acceptable in some cases. The production, however, is very large, and many plants have enough orders in hand to keep them fully occupied for months ahead.

The Victor Talking Machine Company, Camden, N. J., has had plans prepared by Ballinger & Perrot, engineers, for a large addition to its plant. This will consist of a U-shaped building, 172 x 194 ft., six stories. The new power plant, which will develop 4000 hp., will be located in one of the wings of the new building.

The Superintendent of Supplies, Board of Public Education, city of Philadelphia, will receive bids until July 1 for a number of metal lockers to be installed in the new Southern Manual Training School. Specifications may be obtained from A. F. Hammond, Superintendent, room 392, City Hall.

The new plant of C. J. Matthews & Co., to be erected at Langhorne, Pa., from plans by Ballinger & Perrot, engineers,

previous mention of which has been made in these columns, will be used for the manufacture of patent leather. The power equipment for this plant has already been placed. No other machinery will be required as the work of fabrication will all be done by hand.

The Department of Public Works, Bureau of Filtration, city of Philadelphia, George R. Stearns, director, will receive bids until July 8 for a feed water heater for the Lardner's Point pumping station.

The Reliance Steel Foundry Company, which will erect a plant at Trenton, N. J., for the making of steel castings, has established a local office at 432 Bourse Building. It is expected that construction will be started inside the next 30 days.

It is understood that an independent ice making concern, under the name of the North American Ice Company, is to erect three ice manufacturing plants in this city in the near future. These, it is said, will be located along the Schuylkill River. The officers of the company are reported as follows: E. W. Piersell, president; J. R. Lancaster, vice-president, and G. C. McAdams of New York, secretary and treasurer.

The Philadelphia Roll & Machine Company is very busy. Orders are being received in good number for both sand cast and chilled charcoal iron rolls, several of which run up to 10 tons in weight. This company recently purchased a 30-ton electric crane to be used in connection with a proposed extension of its plant in the near future. Deliveries have been very heavy and include rolls for sheet, structural and bar mills, hollow rubber rolls, engine beds and miscellaneous charcoal iron castings, to customers in different sections of the country.

The Wetherill Finished Castings Company, Philadelphia, Pa., has moved its office temporarily to the corner of Twelfth and Cumberland streets.

Chicago Machinery Market.

CHICAGO, ILL., June 25, 1907.

Among the new undertakings of commanding importance that share the attention of the industrial world, none is attracting more attention, especially in the West, than the building of the great steel making plant of the United States Steel Corporation, now rapidly taking form at Gary, Ind. Conjointly with the rise of extensive mill structures and blast furnaces, the building of a notable city is in progress. Broad streets and avenues are being laid out, and besides some business and residence blocks already completed and under way, others are planned for early completion. Provision has been made for civic improvements on a large scale, which will include modern water works, electric light and street car service, adequate for the needs of a populous municipality. By the time the steel works are completed it is assured that Gary will have a population running into the thousands.

For manufacturers of mechanical equipment the point of chief interest in this enterprise lies in the fact that the establishment of the Corporation's plant can confidently be counted on to influence consuming industries to locate in this vicinity. A movement in this direction is already under way, and its progress is being eagerly watched by makers of all kinds of mechanical equipment. It is becoming apparent that because of the exceptional advantages afforded in transportation facilities, close proximity to a base of supplies, and a wide range of suitable factory sites, the time is not far distant when the available shore line of the lake from Gary to South Chicago will be belted with mills and factories. An important step toward this end was disclosed by the recent announcement of the purchase by the American Car & Foundry Company of a large tract for a factory site, which adjoins the corporation's property on the west front on the lake. While no definite date is named for the beginning of construction work, it is understood that the plans of the company contemplate the erection of large works. It goes without saying that the equipment of such a plant will comprise a list of tools and machinery of notable importance, and, though not of immediate interest, will none the less not be lost sight of by the trade. It is said that negotiations by other interests are under way looking to the securing of sites in this zone on the southern boundary of Chicago, which is becoming known as the Calumet Iron and Steel District. The development of no other section in the West is fraught with greater possibilities, and is being watched with keener interest by machinery makers than that now taking place and in prospect in and about Gary.

Among the improvements that are constantly adding to the spreading growth of the Chicago packing houses at the Union Stock Yards, important additions to the boiler equipment of some of the leading plants are reported. Swift & Co. have plans for the erection of another boiler plant, the steel for which has in part, at least, already been received. New water tube boilers aggregating 3000 hp. will be re-

quired for this installation, which will be divided into 500 hp. units. This company, which recently completed a new boiler shop, 111 x 157 ft., suitably equipped for the manufacture of oil car and house tanks, is also increasing the capacity of its steam generative plant by the addition of several boilers of large horse power. Nelson, Morris & Co. are likewise reported to be planning similar extensions. Although detailed specifications are not available, it may be pointed out that these improvements indicate further requirements of mechanical equipment, which generally include electrical, pneumatic and refrigerating machinery.

Ground has been broken for a new plant to be built by the Chicago Railway Equipment Company, Chicago, on a site comprising 16 acres, bounded by South Forty-fourth and South Forty-sixth avenues and Robey and Lincoln streets. The buildings will be of fireproof construction and will in all cover about 150,000 sq. ft. of land. The new site provides excellent switching facilities, having track connection with the Chicago Junction Railway, whose union freight house adjoins. It is the purpose of the company to push construction rapidly forward in order that the plant may be ready for occupancy by January 1. When completed the old plant at Fortieth and Princeton avenues will be vacated and its work concentrated at the new location. Plans for the machinery equipment are not yet available for publication, but it can be safely ventured that, when announced, the machinery interests will find an attractive list in the additional requirements necessary to properly equip the new plant. The output of the company consists of brake beams, bolsters, side bearings and other railroad car equipment. In addition to its Chicago works, the company operates plants at Detroit and Jersey City.

The Mobile Electric Company, Mobile, Ala., of which H. M. Bylesby & Co., Incorporated, Chicago, are engineers and managers, has secured a contract from the Mobile & Ohio Railroad to supply current for the operation of its shops located at Whistler, a suburb three miles distant from the limits of Mobile. The change of motive power involves the installation of motors aggregating 450 hp., which will be divided into approximately 50 units. Material for the building of 3 miles of transmission line will also be required to carry current, not only for the motive power of the shops, but also to supply lights for the town of Whistler, which has a population of about 2000. H. M. Bylesby & Co. are now engaged in preparing plans for the motor equipment for the shops. These will be completed within a short time and when ready bids will be invited for the material needed.

The increased facilities afforded by the extensive additions recently made to the plant of the Independent Pneumatic Tool Company at Aurora, Ill., will, when fully equipped, increase the output fully 50 per cent. Improvements made include a new power house, with additional boiler capacity; new electrical generative apparatus, together with a large amount of new machine tools for the added factory space.

The Wallace Supply Company, dealer in railroad supplies, on account of the fire which recently destroyed the building at No. 2 Washington street, in which it was located, has removed to No. 19 South Jefferson street, where it occupies quarters on the fifth floor. The stock which was seriously damaged by the fire has been replenished, and the company is now in position to execute orders as heretofore.

All bids received by the Board of Public Service, Hamilton, Ohio, at a recent letting for the installation of coal handling machinery in its municipal plant were rejected. New bids are asked on this equipment and will be received up to noon of July 2.

New England Machinery Market.

WORCESTER, MASS., June 25, 1907.

The machine tool situation is a complex one to analyze, so wide a difference of opinion exists among manufacturers and dealers as to the present as well as the future demand. Their experiences in the trade appear to have been attended with very different results. One dealer has found a very marked letting up in orders booked and in inquiries, while another reports the week or fortnight almost up to the corresponding period of last year. A house that has had cause for complaint concerning its business during the spring is now enjoying a very prosperous period. Apparently no two dealers have had the same experience, and in most instances not even similar. The machine tool builders find a slightly lower level of domestic business, taking their reports as a whole, but where domestic orders have fallen off increased demands from foreign dealers and customers have made up the difference.

Dealers, in discussing their business, use two very different bases, and the same thing is true to an extent among the manufacturers in their general talk of the situation. There is a great difference in the volume of orders booked and the amount of business entered upon the ledgers. One dealer will speak of a month's business, reckoning orders re-

ceived during the period which will not represent cash until the machines are shipped. Another dealer will use his ledger total only. In the latter case his month's business may be a large one, yet he may have booked few orders. At the present time a month's actual sales, standing for machines delivered, are made up mostly of orders booked a long time ago, many of them before the first of the year. Such a dealer may report a first rate business, and another, with an equally good ledger account, may state his business as having been very poor, because he has in mind the orders booked and promising inquiries received. Generally speaking, the basis taken is that of orders booked, and this is the subject under consideration in the trade at the present time.

The machine tool builders are rushed as hard as ever. A few concerns are making slight gains in deliveries, but in most instances production just about keeps up with new business. It is expected, however, that before the end of the summer a gain will have been made, partly because of the warm weather reaction, which normally should exist, but to a greater extent because of a tendency on the part of buyers to consider nothing but reasonable deliveries. Probably the actual situation is illustrated in a recent instance of the cancellation of an order for milling machines, releasing a dozen machines for comparatively early shipment. They were greedily absorbed in the market. A much larger lot would have been disposed of without even the trouble of giving general circulation to the fact that the tools were available. One large planer builder reports that he could sell more machines than his works are producing, if he could give satisfactory deliveries. Speaking of cancellations, where they have occurred, it was for some reason that might have existed as naturally last year, at the height of the rush, practically none being because of a weakening in confidence. The users of machine tools, many of them, report a slight falling off in their orders, but not sufficient to make a difference in volume of production; in fact, hardly enough to relieve the pressure of demand.

The general feeling is that the autumn will see a most satisfactory condition of business, unless some unlooked for influence strikes the market. The somewhat menacing early crop reports have been forgotten in the change to more satisfactory agricultural conditions. The labor troubles that affect the machine tool industry are fewer than usual, and are ending one after the other. In New England the few strikes of machinists are petering out. In one or two places there are threats, but the issues raised by workmen are generally regarded as hopeless, with little chance of union success, and very likely they will not materialize. The matter of wages is not an important one in demands that have been made, questions of principle being involved almost exclusively.

It is not expected by the trade that the automobile builders will be as large buyers of machine tools this year as last. There have been cancellations of orders for automobiles, prospective buyers having forfeited the deposits required of them. Most of the factories have not yet sold all of their this season's machines, consequently it is not expected that they will make any unusual provision for an increased output for 1908. There will be considerable business from this source, but the earlier estimates of what the demand should be have now been amended. A considerable total of machinery has already been ordered by the automobile builders, but most of them are holding back until autumn, that they may have a better knowledge of conditions upon which to base their outlays.

The General Electric Company has come into the market for some new machinery, and a few other buyers of considerable lots of tools have been heard from. On the whole, however, orders booked have been for small lots and single tools.

The Confectioners' Machinery & Mfg. Company, Springfield, Mass., is contemplating erecting a large foundry in the Brightwood section of the city. Something depends upon figures as to cost of construction, but plans have been made and it is presumed that building will begin this summer. The plans call for a foundry building 90 x 243 ft. A section 60 x 90 ft. will be four stories, in which will be located fireproof pattern rooms, &c. The remainder of the building will be one story, high enough to install a traveling crane 20 ft. above the floor. The most modern equipment will be provided, if the decision to build is finally reached. The company now operates works in the heart of the city of Springfield. The plan is to eventually build a complete plant at Brightwood, of which the foundry will constitute the initial step.

Joseph E. Knox & Co., Lynn, Mass., manufacturers of dies, are building a new concrete shop, 50 ft. square and one story. It will be equipped with the most modern machinery for die sinking, some of which the company already owns. The company states that it is not yet in position to tell what its requirements will be. The shop will be ready for occupancy in July.

The work of excavating for the large additions to the locomotive repair shops of the Boston & Albany Railroad, West Springfield, Mass., has already begun, and it is understood that construction will be pushed with utmost rapidity

that the new buildings will be ready for occupancy at the earliest possible date. The space between the present machine shop and blacksmith shop will be filled by a building 100 x 480 ft., divided into a machine shop 25 x 480 ft. and an erecting shop 75 x 480 ft. In addition there will be a new tank shop 80 x 200 ft. It is understood that the New York Central Railroad has already placed most of the orders for machinery, cranes, &c.

The Motsinger Rotary Engine Company has been incorporated under Connecticut laws, with capital stock of \$200,000. The incorporators are W. H. Zuber, Elmer A. Kunkle, N. H. Motsinger, Hattie C. Motsinger, and M. W. Crownover, all of Greensburg, Pa. The company states that it will manufacture a new engine, based on the discovery of a new gear co-action. It will be used for automobile and motor boats in the beginning. The company is not yet prepared to give its manufacturing plans.

The New England Butt Company, Providence, R. I., manufacturer of machinery, &c., is to build an addition to its works, 30 x 37 ft., and one story.

The Washburn Wire Company, Phillipsdale, R. I., is planning extensive additions to its works, but is not yet prepared to state just what the additions will consist of.

Cleveland Machinery Market.

CLEVELAND, OHIO, June 25, 1907.

The machine tool market is better than it was earlier in the month, and fully as good as it usually is at this time of the year. During the week a fair volume of business has been done in small orders from concerns that wish to replace old tools by new ones. There seems to be but little if any demand at present for machine tools for additional shop equipment or for new plants. Deliveries in some tools are easier and second-hand tools are not quite so scarce as they were, although as yet they are by no means plentiful. Dealers are looking for about the normal amount of business during the next two or three months. While some manufacturers notice a falling off in orders, others report about as heavy a demand as they have had during the past few months. Those who are getting fewer orders, however, have plenty of work on hand to keep them busy well along into the fall. The easing up in the situation is mainly noticeable among manufacturers of heavy machine shop tools. Makers of hoists and of various kinds of elevating and conveying machinery for industrial plants and mines report no falling off in the heavy demand, and most shops making work of that kind have enough orders on hand to keep them busy several months. Structural shops have a fair amount of work on hand, but report that inquiries are not as plentiful as they were a few weeks ago.

The Browning Foundry Company, Ravenna, Ohio, has been incorporated with a capital stock of \$150,000. Those principally interested in the new company are V. R. and E. H. Browning of the Browning Engineering Company, Cleveland, who at present have the plant of the American Foundry & Machine Company, Ravenna, under lease. The new company is not yet ready to announce its plans.

The J. L. Ballinger Construction Company, Columbus, Ohio, has closed a contract for the building of a Portland cement plant with a daily capacity of 2500 bbl. for the Continental Portland Cement Company of St. Louis. The contract price is about \$1,000,000. The Continental Company is a West Virginia corporation, capitalized at \$3,500,000, which was promoted and organized by John A. Cruikshank of Bellefontaine, Ohio, and Charles F. Ritter of Covington, Ky.

The Toledo Auto Parts Mfg. Company, Toledo, Ohio, has been incorporated with a capital stock of \$50,000 to manufacture automobile parts and other steel products. The men principally interested in the company are W. N. Taylor, who for some time has been general superintendent of the Toledo Works of the Pope Motor Car Company, and F. C. Cook, proprietor of the Globe Machine Company. The other incorporators are G. Ohlinger, T. B. Earl and D. White. The company expects to locate in a plant on Oakwood avenue and has already received some machinery. It has booked several large orders for its output.

The Safety Meter Lock Company, Columbus, Ohio, has decided to change its name to the Ohio Brass & Iron Mfg. Company, and to increase its capital stock to \$75,000. In addition to the iron foundry now operated, the company intends to add a brass foundry, for which new equipment will probably soon be purchased. Frank J. Macklin is president; F. C. Kingsbury, vice-president; A. J. Pray, secretary, and M. Loofbourrow, treasurer.

The Oster Mfg. Company, die stock manufacturer, has commenced the erection of a machine shop that will largely increase the capacity of its plant on East Sixty-first place. The new building will be of brick, 40 x 146 ft., and two stories high. No new equipment will be purchased at present.

The Van Dorn-Elliott Electric Company has changed its name to the Van Dorn Electric & Mfg. Company. No change in the company's business is contemplated.

Plans for large additions to the plant of the Byers Machine Company, Ravenna, Ohio, have just been completed by George S. Rider & Co., engineers, Cleveland. The plans provide for a foundry, 50 x 80 ft.; forge shop, 40 x 60 ft., and an assembling room, 45 x 100 ft.

The C. O. Bartlett & Snow Company, Cleveland, has recently received orders for coal and ash elevating and conveying machinery and coal crushing machinery from the American Steel & Wire Company, for the Cleveland and Rankin, Pa., mills; Cleveland Worsted Mills Company and Soldiers' Home at Marion, Ind. The company is also erecting a Green self dumping car haul for the Mineral Ridge Mfg. Company at Byersville, Ohio. It reports a heavy demand for dryers and has recently received orders from the Grasselli Chemical Company, Cleveland; Mogul Mining Company, Silverton, Colo.; Hamilton Powder Company, Hamilton, Ont.; Pennsylvania Salt Company, Philadelphia, Pa., and the Harshaw, Fuller & Goodwin Company, Cleveland. The company is also erecting an electric hoist and conveyor for the Zettelmeyer Coal Company, Cleveland. Enough work is on hand to keep its plant busy for five months.

Cincinnati Industrial Notes.

CINCINNATI, OHIO, June 25, 1907.

The Industrial Bureau is pursuing a systematic course of advertising in a number of the trade journals to the end that manufacturers desiring to locate where conditions are unsurpassed shall take up the matter with the secretary of the bureau, W. L. Finch, who is in a position to offer all who come the site best adapted to the needs of each. This week there will visit the bureau a prominent manufacturer from another city, who is looking for a site for the establishment of a plant for the manufacture of traction engines and specialties. He is to be particularly shown conditions as they exist at the new Factory Colony Company, at Oakley, and may conclude to form a part of this colony. If this company is secured it will prove to be quite an acquisition to the plants of the city, and will mean the purchase of new equipment throughout.

As a further evidence of the expansion going on, the Eagle Belting Company, at present located at Canal and Jackson streets, has purchased a six-story brick factory building on Livingston street, at a cost of \$14,000. Plans are now under way to overhaul and rebuild the entire structure, which has a frontage of 39 ft., and is 90 ft. in depth. This company was started some two or three years ago by John Caldwell, and has been securing its product in a partly finished state from an Eastern city. This will now be done away with, and a complete new line of special machinery installed, for which tools it is now in the market.

About 2 acres of fireproof cattle sheds are to be erected by the Cincinnati Union Stock Yards Company to take the place of those which recently collapsed. They will cost about \$28,000 and will be composed of steel columns and roofing, with concrete foundations. Joseph G. Steinkamp & Bro. are the architects.

The Columbus Structural Steel Company has moved into its new offices, which have just been completed at the Buttles avenue plant. The new office building consists of four rooms and is fitted up in modern style.

The Standish Machine & Supply Company, Columbus, Ohio, manufacturer of shafting and heavy machinery, has recently installed a new boiler and engine, as well as improved electrical machinery. Other changes are contemplated in the near future, as the company under present conditions is practically unable to keep abreast of orders that are coming in, especially from foreign points.

Government Purchases.

WASHINGTON, D. C., June 25, 1907.

The Bureau of Supplies and Accounts, Navy Department, Washington, will receive bids until July 2 for two motors for the Newport torpedo station.

The Bureau of Supplies and Accounts, Navy Department, Washington, will receive bids until July 9 for boilers, engine lathe and other supplies for the Puget Sound Navy Yard.

Bids will be received until July 20, at the Bureau of Yards and Docks, Navy Department, Washington, for two 20-ton travelling cranes for the Puget Sound Navy Yard.

The Bureau of Supplies and Accounts, Navy Department, Washington, will receive bids until July 9 for a dust collector system, trimming press, &c., for the Washington Navy Yard, and one electric traveling crane for the Pensacola Navy Yard.

The following bids were opened June 18 for machinery for the navy yards:

Bidder 45, The Frevert Machinery Company, New York; 48, Fairbanks Company, New York; 56, Garvin Machine

Company, New York; 73, Hendey Machine Company, Torrington, Conn.; 93, Motley, Green & Co., New York; 98, Manning, Maxwell & Moore, New York; 102, Niles-Bement-Pond Company, New York; 119, R. H. & F. M. Roots Company, New York; 131, B. F. Sturtevant Company, Hyde Park, Mass.; 168, Landis Machine Company, Waynesboro, Pa.

Class 31. One threading and tapping machine—Bidder 45, \$1363 and \$1313; 98, \$1397 and \$1339; 168, \$1300.

Class 32. One rotary blower and motor—Bidder 119, \$2194; 131, \$3035, \$3450 and \$3335.

Class 41. One extension gap lathe—Bidder 48, \$1690; 56, \$2214.82; 98, \$2248; 102, \$2657.

Class 42. One screw cutting, back geared engine lathe—Bidder 56, \$1030; 73, \$1764; 98, \$882; 102, \$993.

Class 43. One column shaping machine—Bidder 102, \$840.

Class 44. One sensitive drill—Bidder 48, \$112.

Class 45. One power feed drill press—Bidder 56, \$415; 102, \$293.

Class 46. One emery grinder—Bidder 45, \$334; 48, \$130; 93, \$337.50 and \$347.50; 102, \$250.

On June 20 the following bids were opened at the Navy Department, Washington, for the two new 20,000-ton battleships: The Newport News Shipbuilding Company, \$3,987,000; Fore River Shipbuilding Company, \$4,480,000; William Cramp & Sons Shipbuilding & Engine Company, \$5,100,000; New York Shipbuilding Company, \$4,545,000.

Bids were received as follows at the United States Engineer Office, Washington, D. C., June 13, for the construction of a 10-in. hydraulic dredge:

Item 1, in accordance with Government specifications; 2, in accordance with bidder's specifications:

Ellicott Machinery Company, Baltimore, Md., item 2, \$27,470.

Alexander Miller & Brother, Jersey City, N. J., item 1, \$39,500.

Wetherill Brothers Machinery Company, Chester, Pa., item 2, \$26,400.

The following awards have been made for supplies for the navy yards, bids for which were opened May 28:

Niles-Bement-Pond Company, New York, class 22, two horizontal boring, drilling and milling machines, \$33,800; class 327, four drill presses, \$400.

Pratt & Whitney Company, Hartford, Conn., class 304, two new model engine lathes, \$2906; class 305, two tool-room lathes, \$1244; class 310, four drill presses, \$616.

Prentiss Tool & Supply Company, New York, class 302, one turret lathe, \$1139; class 306, one turret lathe, \$428; class 307, one turret lathe, \$541; class 308, four bench lathes, \$1738; class 309, three bench drills, \$72.75; class 321, two shapers, \$652; class 322, two shapers, \$808; class 328, one automatic gear cutter, \$655; class 334, one plain screw machine, \$684.

Brown & Sharpe Mfg. Company, Providence, R. I., class 23, one surface grinding machine, \$634; class 311, two automatic screw machines, \$1562; class 313, one plain grinding machine, \$684; class 317, one plain milling machine, \$1985.75; class 318, one universal milling machine, \$742.50; class 319, two universal milling machines, \$1840; class 320, two vertical milling machines, \$1676; class 323, one surface grinding machine, \$375; class 324, one universal cutter and reamer grinder, \$227.50; class 325, one universal grinder, \$657; class 326, one universal grinder, \$838.

Stoeber Foundry & Mfg. Company, Myerstown, Pa., class 41, one motor driven pipe bending machine, \$1525.

Mosher Water Tube Boiler Company, New York, class 43, four water tube boilers, \$7800.

Bridgeport Safety Emery Wheel Company, Bridgeport, Conn., class 314, four emery wheel grinders, \$240.

Bullard Machine Tool Company, Bridgeport, Conn., class 330, one vertical chucking machine, \$978; class 331, one vertical boring machine, \$2537.

Industrial Works, Bay City, Mich., class 341, one 10-ton locomotive crane, \$5900.

Classes 315, one plain milling machine; 316, one plain milling machine, and 333, one wire feed screw machine, have been canceled.

Under bids opened June 4 for supplies for the navy yards, E. J. Elting, Philadelphia, Pa., has been awarded class 52, one cupola, \$595.

Under bids opened May 7, circular No. 362, for supplies for the Isthmian Canal Commission, the Industrial Works, Bay City, Mich., has been awarded class 1, four locomotive cranes, \$39,820.

August Mietz, New York, has been awarded contract for one three-cylinder, 24-hp. vertical oil engine, for the light and fog signal station at White Shoal, Mich., \$1926.

The Babcock & Wilcox Company, New York, has been awarded contract for the boilers and accessories for the Pensacola Navy Yard, at \$33,476.

Catalogues Wanted.—The Department of Mechanical Engineering Practice of the Carnegie Technical Schools, Pittsburgh, Pa., is starting a catalogue file and requests manufacturers of machinery to send catalogues. Complete information is desired on all lines of mechanical work, from boilers and engines to automatic and special machinery. Catalogues should be sent in care of Professor Trinks.

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HARDWARE

THE meeting of the National Retail Hardware Association at Boston last week was an important and dignified gathering, attended by nearly 100 delegates, representative men of the trade as well as of the associations with which they are connected. Its deliberations were under the direction of President Bush, an excellent presiding officer, and as a merchant of culture, ability and position, a worthy leader of the growing organization. Among the subjects discussed were many of the great problems by which the trade is confronted, including, of course, the time-honored catalogue house question in private sessions, and in a more open way such grave matters as the control of prices, the regulation of freight rates, the nation's waterways, parcels post, the neutralization of private property in time of war, and other familiar but less stately topics more closely connected with the sale and distribution of Hardware. A very cordial reception was given to the visitors, on whom the most pleasant impression must have been made, not only by the very interesting capital in which they met but also by the abounding New England hospitality manifested.

While the discussions and papers to which the delegates listened were instructive and stimulating, it is a question whether the occasion was utilized as well as it might have been for the advancement of the interests and work of the association, which would seem to be the proper subjects for consideration at a national convention. There was, indeed, attention given to the routine business of the association and to reports covering the work of the past year, with some consideration of principles and plans bearing upon its future activities. Of this, however, there was comparatively little, and the gathering seemed to be but little different from a well organized State convention, in which a good part of the time is given to the consideration of trade questions in their bearing upon the retail merchant and of methods which are to be pursued by them in the conduct of their business. All this was undoubtedly interesting and suggestive to those who were present, but the number was necessarily small in comparison with the hundreds which attend the larger State gatherings. There are broad questions of policy, some of them of not a little difficulty and in regard to which there is difference of opinion, which might with advantage be discussed and perhaps determined by the association in formal session, thus giving the officers directly charged with the carrying on of its activities the benefit of the counsel of delegates representing different parts of the country and varied interests and conditions. As a representative body made up of delegates from the various States it would seem more in accordance with the spirit of the organization if the work of the association could have been the chief subject considered, with a view to making plans for extending the organization, improving the methods of association activity, devising, if not legislating, for the constituent associations, and in general exercising a broad supervision of the great Hardware field, with a view to the correction of abuses and the advancement of the interests of the retail merchants through organized effort.

Condition of Trade.

The coming of summer weather has normally a somewhat depressing effect upon trade, but this year any influence it may have in this direction is more than counterbalanced by a recognition of its beneficent effect on the crops and the more cheerful tone imparted by the encouraging reports from the great agricultural States. Very fortunately a much more cheerful view than prevailed a few weeks ago in regard to the prospects for the harvests is now apparently justified. This induces a hopeful feeling that the crops after all may be fair and certainly will command good prices, thus laying a basis for continued prosperity in the farming communities which will naturally contribute ultimately to the commercial and industrial interests of the country at large. There is no doubt, however, that the talk about the crops and the apprehension of more or less shortage in yield has, together with other more serious influences, tended to check somewhat the courage of the trade in buying and of capital in entering upon new ventures. In the Hardware field there is evidence of more conservative purchasing on the part of merchants, but the volume of business is good, and in many lines there is still complaint of slow shipment and a scanty supply of goods. Prices generally are very steadily held, and in a good many lines the present cost of material and of manufacture would justify higher quotations. Manufacturers, however, are generally reluctant to make advances at this juncture, realizing that the high prices ruling are something of a menace to the market, and tend to discourage enterprise and investment. The half year closes with a great record, many manufacturers finding that its business has been up to that of last year and in some cases has surpassed it. Collections are often complained of as sluggish and in some cases difficult.

Chicago.

Adverse trade conditions if any were to be reported, could no longer be charged to unfavorable weather, for in this respect the midweeks of the month have left nothing further to be desired. The extent of damage already done to growing crops by unfavorable influences, that have in past weeks given rise to much alarm, cannot yet be accurately measured; but whatever the final results may be, confidence has been materially bolstered by the appearance of real summer days that at length seem to have come to stay. The heavy shipments that continue to come forward on contract orders contribute largely to the maintenance of trade upon a level not far below that of the former months of this year. It is, however, evident that the demand in most lines is slowly drifting into a period of summer lull. While jobbers and retail merchants are still busily engaged there is manifestly less new business developing, though it cannot perhaps be said that the decrease thus far noted is more than is commonly expected at this season of the year. Jobbers say that in spite of the better mill deliveries reported on Wire Nails and Barb Wire, both of these commodities are still scarce. Difficulty is experienced in keeping an unbroken assortment of sizes in Nails. Generally, however, marked improvement in shipments is reported, and in some goods manufacturers are now shipping with normal promptness. Indeed, it is noticed that here and there factories are soliciting orders with more urgency than has characterized their efforts for many months. Although there is still some talk of price advances on certain lines, it is generally believed that the upward tendency is not backed by sufficient strength to effect further

important changes toward advance in prices. The movement on Wire Cloth and Screen Doors, that until recently has dragged, is now in full swing and bids fair to make up in extra activity for the time lost in starting. Conditions of supply and demand in Heavy Hardware lines are not appreciably changed. A general survey of the situation confirms the belief that things are slowly settling down to a less strenuous pace, in which both the jobber and manufacturer will find more comfort and perhaps not much, if any, less profit.

New Orleans.

WOODWARD, WIGHT & Co.—General conditions in this section have improved materially in the last few weeks. While we do not at all expect to make a record breaking cotton crop and while the crop will undoubtedly be short, we are in nowise as much worried about the situation as we were a month ago. The rice prospects also look better; sugar and lumber are doing very well. Financial conditions in the city are easing up materially.

Goods are moving more easily than they were 30 days ago in practically all the lines carried here in New Orleans. Country merchants are buying with a great deal of discretion and not overstocking, and exercising great care in the credit they extend. Labor is a little bit easier to get than it was.

Considerable import trade is being done here now in Heavy Hardware, which, owing to our low freight rates to New Orleans from abroad, will probably develop into considerable proportions.

The building industry is very active. There are some 14 large buildings in the way of hotels and office buildings under erection or with the work practically started on them.

If the North and West will only be fortunate enough to furnish good crops, 1907 with us in this section has every prospect of being a good year, although perhaps not as good as 1906. And if the North and West are unfortunate in their crop situation, we have had so many years of high priced cotton and lumber that we are in shape in the South here to stand some pretty hard jolts without any real trouble.

NOTES ON PRICES.

Wire Nails.—While new demand is active and specifications on contract orders are being received in large volume, it was decided at a meeting held in Chicago on June 24 to make no change in prices. Mills are still from six to eight weeks behind shipments. In some cases indeed, orders of much longer standing are in arrears, giving occasion for complaint that later orders are executed out of their turn. Prices are firm with slight premiums sometimes paid for prompt shipments. Quotations are as follows, f.o.b. Pittsburgh, plus actual freight to point of delivery, 60 days, or 2 per cent. discount for cash in 10 days:

Carloads, to jobbers.....	\$2.00
Carload lots, to retail merchants.....	2.05

New York.—Demand continues in good volume for the season. While mills talk of being only about three weeks behind on shipments, deliveries are still delayed beyond that period in many instances. The local market is fairly well maintained with the exception that sometimes Hardware jobbers sell Nails at less than regular quotations to effect the sale of other goods. New York jobbers' quotations are: To retailers, carloads, on dock, \$2.19; less than carloads, on dock, \$2.33; small lots at store, \$2.30.

Chicago.—The story of yesterday is still the story of to-day, when Wire Nails is the subject. According to all precedent the demand should at this season show a marked decrease, but it nevertheless continues heavy. Not only are shipments on contract orders large, but new orders are also strongly in evidence. Quotations are as follows: \$2.18 in car lots to jobbers and \$2.23 in car lots to retailers, with an advance of 5 cents for less than car lots from mills.

Pittsburgh.—A meeting of a number of leading Wire Nail interests was held in Chicago on Monday, June 24,

at which trade conditions were discussed, but it was decided to make no change in prices. While the season is late, new demand for Wire Nails is active and specifications against contracts are coming in very freely to the mills, which are still from six weeks to two months or longer behind in shipments. The volume of trade in Wire Nails in the first half of this year has broken all records, being very much in excess of the similar period last year and which was also very active. Prices are firm, and slight premiums are sometimes paid for prompt shipment. Quotations are as follows, f.o.b. Pittsburgh, plus actual freight to point of delivery, 60 days, or 2 per cent. discount for cash in 10 days:

Carloads, to jobbers.....	\$2.00
Carload lots, to retail merchants.....	2.05

Cut Nails.—At the meeting of the Cut Nail Association, held in Philadelphia on June 25, existing prices were reaffirmed for the month of July. While prices were reaffirmed, it is stated that the actual selling price of the association manufacturers is 5 cents above regular quotations, or on the basis of \$2.10 in carload lots to jobbers, f.o.b. Pittsburgh. Specifications on contract orders are coming in fairly, but mills are making more prompt shipments, owing to an improved supply of steel and cars. The demand in the way of new business has recently shown some increase, but is mostly for small lots. Mills seeking business sometimes make concessions of 5 to 10 cents per keg. Quotations are as follows, f.o.b. Pittsburgh: Carload lots, to jobbers, \$2.05; less than carloads, to jobbers, \$2.10; less than carloads, to retailers, \$2.20. Iron Cut Nails at points west of and including Buffalo and Pittsburgh are held at 10 cents advance on Steel Cut Nails.

New York.—Demand is about in the usual proportion to that of Wire Nails. The market is generally maintained, but jobbers of Hardware sometimes sell small lots of Nails at less than jobbers' regular quotations to secure business in other lines. New York jobbers' quotations are on the basis of \$2.30.

Chicago.—But little complaint is now heard of delayed shipments, and jobbers' stocks are generally well supplied. Demand is fair and prices are reasonably well maintained. Quotations are as follows: Iron Cut Nails, car lots, to jobbers, \$2.33; to retailers, \$2.38; Steel, to jobbers, in car lots, \$2.23; to retailers, \$2.28.

Pittsburgh.—The favorable weather of the past two weeks has stimulated demand to some extent, but which is still mostly for small lots. Specifications against contracts are coming in freely, and the Cut Nail mills are pretty well caught up on back orders, due to the better supply of Steel and of cars. Mills that are in urgent need of business sometimes make concessions of 5 to 10 cents a keg. Quotations are as follows, f.o.b. Pittsburgh: Carload lots, to jobbers, \$2.05; less than carloads, to jobbers, \$2.10; less than carloads, to retailers, \$2.20. Iron Cut Nails at points west of and including Buffalo and Pittsburgh are held at 10 cents advance on Steel Cut Nails.

Barb Wire.—According to a decision reached at a meeting of the Wire interests, held this week in Chicago, no change will be made in prices. Specifications on contract order continue to come in freely, while new orders are comparatively light. Some improvements in deliveries is reported. Quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

	Painted.	Gal.
Jobbers, carload lots.....	\$2.15	\$2.45
Retailers, carload lots.....	2.20	2.50
Retailers, less than carload lots.....	2.30	2.60

Chicago.—Liberal specifications and some new business yet being offered combine to keep shipments up to a large volume. The principal mill interests report but slight improvement in deliveries. We quote as follows: Jobbers, Chicago, car lots, Painted, \$2.33; Galvanized, \$2.63; to retailers, car lots, Painted, \$2.38; Galvanized, \$2.68; retailers, less than car lots, Painted, \$2.50; Galvanized, \$2.80; Staples, Bright, in car lots, \$2.30; Galvanized, \$2.60; car lots, to retailers, 10 cents extra, with an additional 5 cents for less than car lots.

Pittsburgh.—At a meeting of the Wire interest in

Chicago this week it was decided to make no change in prices. New orders are rather light, but specifications against contracts are coming in very freely. The supply of steel and of cars is very much better, and the mills are catching up to some extent on back orders. Quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

	Painted.	Gal.
Jobbers, carload lots.....	\$2.15	\$2.45
Retailers, carload lots.....	2.20	2.50
Retailers, less than carload lots.....	2.30	2.60

Smooth Fence Wire.—A fair amount of new business is being placed, while specifications on contract orders are still coming to the mills in good volume. Some improvement in deliveries is being made. At a meeting of Fence Wire manufacturers, held in Chicago this week, it was decided that no change would be made in prices. The market is firm, and quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

Jobbers, carloads.....	\$1.85
Retailers, carloads.....	1.90

The foregoing prices are for base numbers, 6 to 9. The other numbers of Plain and Galvanized Wire take the usual advances, as follows:

	6 to 9	10	11	12	12½	13	14	15	16
Annealed.....Base.	\$0.05	.10	.15	.25	.35	.45	.55		
Galvanized....	\$0.30	.35	.40	.45	.55	.65	1.05	1.15	

Chicago.—An exceptionally strong demand that filled the mills with large tonnage contracts is responsible for the prolongation of heavy shipments that are still being made in execution of these orders. Progress is at length being made in the clearance of deferred orders. Quotations are as follows: In car lots, to jobbers, \$2.03, f.o.b. Chicago, and to retailers, \$2.10.

Pittsburgh.—Specifications against contracts continue to come in freely, and a fair amount of new business is also being placed. At their meeting in Chicago this week the Fence Wire manufacturers decided to make no change in prices, which continue very firm. We quote, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

Jobbers, carloads.....	\$1.85
Retailers, carloads.....	1.90

Stanley Rule & Level Company.—Stanley Rule & Level Company, New Britain, Conn., New York office 107 Chambers street, is now quoting net prices on all its goods to the trade, instead of by list and discount, as formerly. This change affects prices of a wide range of goods, such as Planes, Rules, Gauges, Squares, Screw Drivers, Braces, Levels, &c., of which the company manufactures a large and leading line.

Copper Products.—The market for these materials continues as it has been for some time, a passive and waiting one. While the rolling mills and manufacturers of Copper and kindred commodities have not reduced prices there is very little buying, and such as there is continues to be of a hand to mouth character, to supply actual, immediate wants, some users even postponing specifications in anticipation of a lower level all along the line in sheets, tubes, wire, rods and analogous goods. A reassuring feature of the situation is that while consumption is very moderate and at a low level, many producers do not seem to be exercised over prevailing conditions; rather taking it, along with the weather, as something to be expected and a matter of course.

Galvanized Tubs.—List prices on the sizes of Galvanized Tubs in best demand have just been advanced by leading manufacturers \$3 per gross; other sizes, \$2 per gross. Quotations to retail trade remain unchanged, and may be fairly represented by a discount of 10 per cent. from the list. The market has long been firm and fairly uniform, and appears to be in a condition entirely satisfactory to the manufacturers.

Sad Irons.—Leading manufacturers of Mrs. Potts' Sad Irons have made an advance of 3 cents per set, in both japanned and tinned top lines. The movement in-

cludes Enterprise Irons as well as the brands which are maintained on a slightly lower level.

Dripping Pans.—There seems to have been a decided improvement in the prices for Dripping Pans, a line which, owing to sharp competition, has been in a somewhat demoralized condition for several months. Published prices of leading manufacturers have just been advanced from 70 and 12½ per cent. discount to 65 and 7½ per cent. discount.

Rope.—There has been some shrinkage in the volume of business done by manufacturers during the past 10 days, and the market is correspondingly weak in the mixed grades of Rope. Under these conditions card prices, represented by the following quotations, are not adhered to in all instances, with the exceptions of Bolt and high grades of Manila Rope, which are maintained. Quotations are as follows: Pure Manila, 13 to 13½ cents; B quality, 12 to 12½ cents. Pure Sisal, 9¼ cents; No. 2 quality, 7¾ to 8 cents; No. 1 Jute, ¼ in. and up, 9 cents; No. 2 Jute, 8½ cents.

Window Glass.—At the meeting of the Central Window Glass Jobbers' Association held in Cleveland last week, prices were reaffirmed, pending another meeting scheduled for July 16. The Brokerage Company has announced the following advance in prices, the discounts being from the manufacturers' list: First three brackets, single, 90 and 5 per cent.; all other single, 90 and 10 per cent.; all sizes double, 90 and 15 per cent. discount. On the twenty-fifth inst., a meeting of the Western Window Glass Jobbers' Association was scheduled to be held in Chicago, from which no report has been received at this writing. Manufacturers report some improvement in demand during June over that of May. Jobbers seem to anticipate higher prices, but they generally are slow about announcing them in view of the limited demand. There is reported to be a good deal of inferior Glass in the hands of jobbers throughout the country which, it is thought, will have to be worked off at lower prices than that of better quality. In the uncertain condition of the market it is difficult to give exact prices, but the following quotations will serve as a guide in buying. Quotations are as follows: Jobbers' quotations from jobbers' list October 1, 1903, Greater New York, 90 and 15 per cent. discount on all sizes, single and double strength. Outside of Greater New York, in the Eastern District, prices are not uniform, ranging from 90 and 5 for single and 90 and 10 per cent. discount for double, to 90 and 15 for single and 90 and 20 per cent. discount for double, according to location of territory. Minimum prices recommended by the Western Window Glass Jobbers' Association are as follows: Jobbers' quotations from jobbers' list October 1, 1903: 90 and 10 per cent. for single and 90 and 15 per cent. discount for double strength Glass.

Linseed Oil.—There is comparatively little doing in the way of new business, while specifications on contract orders have been seasonable. Crushers are not anxious to make sales for future distant delivery, owing to the strength of the Seed market. New York quotations are as follows, according to quantity: City Raw, 45 to 46 cents per gallon; Out of Town Raw, 44 to 45 cents per gallon. Boiled Oil is 1 cent a gallon over Raw.

Spirits Turpentine.—The local market is dull, demand being light. The market has advanced ½ cent during the week, owing to firmer Southern conditions. New York quotations are as follows, according to quantity: Oil Barrels, 60½ to 61 cents; Machine Made Barrels, 61 to 61½ cents per gallon.

E. C. ADAMS has opened a manufacturers' sales agency at Seattle, Wash., handling various iron and steel products. Mr. Adams has had an extended experience in the Hardware line, having been 10 years manager for the C. H. Benton Hardware Company, Fond du Lac, Wis., two years as Pacific Coast representative for Farwell, Ozmun, Kirk & Co., St. Paul, Minn., and 15 years as president and treasurer of the Adams Hardware Company, Port Townsend, Wash.

Hardware Window Display

TWELFTH ARTICLE.

IN previous articles of this series we have shown several displays of Lawn and Garden Tools and accessories. Being seasonable lines of great interest to a large number of householders, these goods are very well adapted to window display with profitable results. Garden Hose is a line which perhaps is not easy to dispose of in an attractive way, but we present herewith an exceedingly practical and effective method of displaying it, originated by the John E. Bassett & Co., New Haven,



Fig. 38.—Method of Preparing a Display of Garden Hose.

Conn. As shown on the right in Fig. 38, a rough drum may easily be made out of pieces of board on which lengths of Hose may be wound. The drum consists of two disks—four half disks will be just as well—joined by cross pieces as indicated in the cut. The center is then covered with a circular piece of cardboard, as shown at the left, on which the brand, length, size, price and other information may be lettered with a brush. The Hose lengths wound on the drums should, of course, be fitted with Nozzles and Couplings, so that the whole outfit can be offered ready for use. 50 ft. lengths of Hose put up in this way may be very attractively displayed either inside the store or in the window, perhaps as the background for other Lawn and Garden Implements.

Skates may be shown to advantage by fastening braided cord of some bright color from the lower corners

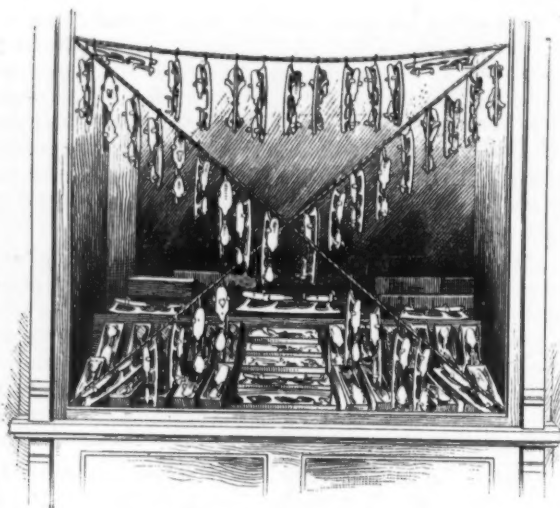


Fig. 39.—A Good Skate Window.

of a window to the opposite upper corners and securing them at the crossing point, Fig. 39. Short strings should be tied at regular intervals over these lengths of cord and to each of these a Skate may be attached. The number of Skates shown will of course be regulated by the size of the window and other local considerations, as well as by the individual taste. The cords being diagonal and the Skates hung perpendicularly, they can be placed close together without interfering with each other, but it is not well to make them too near, for by so doing other goods in the window are obscured. In the illustration the background consists of Skates in boxes, closed and

open. There are, however, many other lines of winter goods which would form a good background for such a display.

Emblems and Designs Made of Goods.

An ingenious window dresser can make exceedingly effective displays by fashioning emblems or artistic designs out of the goods he has to show. This form of display is especially adapted to the use of the Hardware merchant, as he handles many small articles which can very easily be arranged to represent such designs. In Fig. 40 are reproduced several emblems made of zigzag Rules, Squares, Auger Bits, Nails, Screws, Corkscrews,

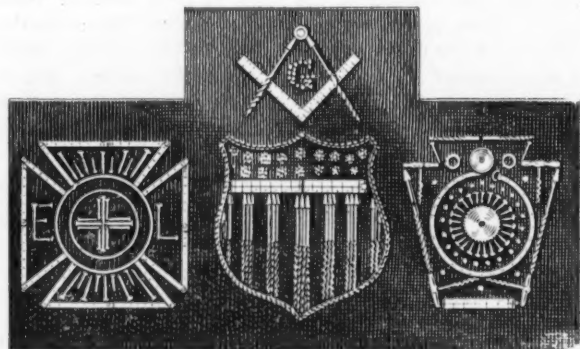


Fig. 40.—Emblems Made of Small Articles Arranged on a Dark Background.

Tape Measures, &c. These are set off most effectively by a background of dark material, and may be shown either on a flat window floor or on an inclined stand, such as has been shown in a former article. A study of these emblems will readily suggest to a clever window dresser ways and means of producing similar effects, which will be interesting in his community.

(To be continued.)

REQUESTS FOR CATALOGUES, &c.

The trade is given an opportunity in this column to request from manufacturers price-lists, catalogues, quotations, &c., relating to general lines of goods.

REQUESTS for catalogues, price-lists, quotations, &c., have been received from the following houses, with whom manufacturers may desire to communicate:

FROM SEPAUGH HULL LUMBER COMPANY, Elderville, Texas, which handles Shelf and Heavy Hardware, Stoves, Tinware and Sporting Goods.

FROM WAITH, FERDON & Co., Lewiston, Idaho, who are about to engage in the Hardware business.

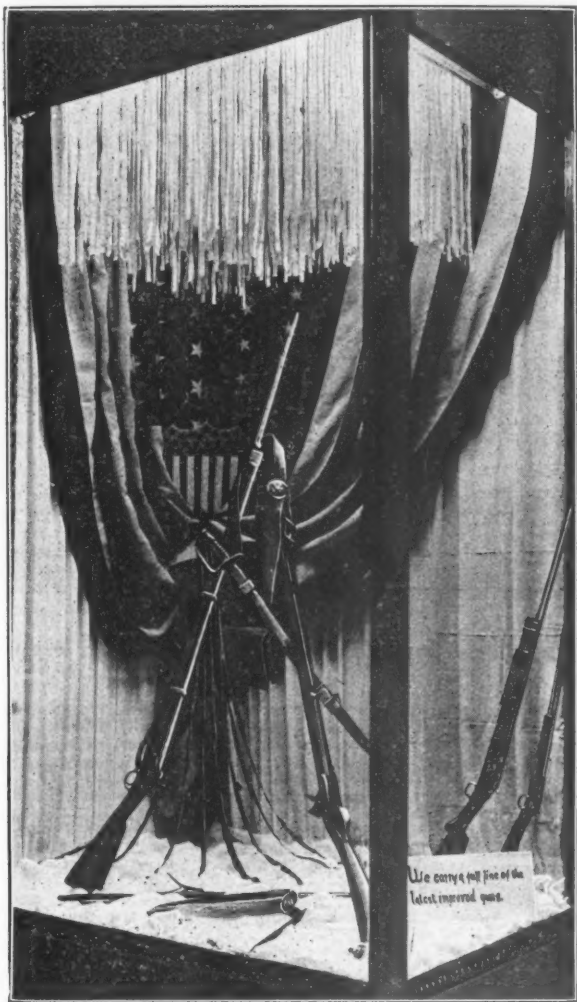
FROM MCGREGOR & CAMPBELL, Chesaw, Wash., who were damaged by fire to the extent of \$7000 on the 31st ult. The lines carried by the firm include General Hardware, Agricultural Implements, Mining Supplies, Builders' Hardware, Saw Mill Machinery, Harness, Leather Goods, &c.

FROM BUFFALO HARDWARE & FURNITURE COMPANY, Buffalo, Kans., handling a general line of Hardware and Furniture.

THE ERIE SPECIALTY COMPANY, Erie, Pa., will have an elaborate exhibit at the annual House Furnishing Goods Exhibition, which will be held in Madison Square Garden, New York City, August 5-10. The company has secured space No. 1, which occupies a conspicuous position at the main entrance to the Garden, and is 20 by 10 ft. 6 in. in dimensions. Here will be shown its line of Quick and Easy and other Cork Pullers, Cork Screws, Lemon Squeezers, Shakers, Ice Shavers, Vegetable Mashers, Ice Cream Dishers, &c. E. Walker, C. L. Walker and A. W. Brant will be present during the exposition to greet visitors and look after the interests of the company. Lately the company has got out a display stand for the merchant's use in calling attention to the Quick and Easy Cork Pullers, which is furnished without charge.

MEMORIAL DAY WINDOW DISPLAY.

THE illustration herewith is of a Decoration Day window exhibit, prepared by the E. N. Howell Hardware Company, Dixon, Ill. The background of the window was white cheesecloth laid over white paper, two American flags being also draped to advantage. Hanging from the ceiling was a mass of white tissue paper strips, giving an artistic effect. The old guns, sword and car-



Memorial Day Window Display of E. N. Howell Hardware Company.

tridge belt stacked in the center of the window saw actual use in the Civil War in the hands of men, some of whom are still residents of Dixon, others having passed away. A card in the bottom of the window supplied particulars in regard to the battles in which the arms and their bearers had participated. At the right of the window were two modern Guns, which made an interesting contrast. Another card assured the curious that a full line of Guns of the latter class was carried.

GREEN PAINTED WIRE CLOTH ?

THE question of eliminating the sale of Green Painted Screen Wire Cloth has been recently discussed to some extent, and many jobbers and retailers have discontinued the sale of it. In favor of the elimination it is pointed out that the manufacturer, jobber and retailer will not have to carry a stock of two kinds of Wire Cloth to satisfy the customer, and as no one ever drops the sale of Black Cloth to substitute Green, the contrary being true, that the Green is being dropped, it is apparent that in the near future the Green Cloth will not be in demand. In order to bring this about promptly the manufacturers believe it is wise to discontinue carrying it in stock, and jobbers and retailers are requested to cooperate with manufacturers in this effort and advise their customers to use Black Wire Cloth exclusively. Galvanized Cloths having come into the market it is now necessary for a jobber and retailer to carry a stock of the various sizes of Galvanized Wire Cloth, and in many sections also a stock of Bronze Wire Cloth. It is now proposed by the manufacturers, unless there is a very strong opposition by the Hardware jobbers, to practically discontinue the making of Green Wire Cloth, but it will be furnished upon specifications for a time, that the trade may be able to match up sizes in whatever stocks are on hand.

WOOD SHOVEL & TOOL COMPANY'S CATALOGUE.

THE WOOD SHOVEL & TOOL COMPANY, Piqua, Ohio, has just issued an especially attractive and well-arranged catalogue of its line of Shovels, Spades, Scoops and Drainage Tools. A feature of the catalogue is the fact that each tool is illustrated by two half-tones, one showing the profile and the other the front view, thus giving an excellent idea of the shape and appearance of the goods. The catalogue is elegantly printed, and presents the line to which it is devoted in a way that is very creditable to the company, and which will doubtless serve the convenience of the trade.

SARGENT & Co., held their annual reunion of salesmen and heads of departments, both from New York and New Haven, at the latter place last week. It is the custom of the house to gather in its traveling men at about this time annually and go over prices and various phases of the business relative to the marketing of goods. On previous occasions there has been something in the way of entertainment, but this year it was purely a business gathering.

THE second annual midsummer joint meeting of the Cycle Manufacturers' Association and the Cycle Parts and Accessories Association will be held at Atlantic City, N. J., August 6-9. The headquarters will be at the Shelburne Hotel. An outline of the programme has been issued, but complete details will soon be sent out. W. J. Surre of the Corbin Screw Corporation, New Britain, Conn., is chairman of the Joint Committee of Arrangements.

THE BOSTON CONVENTIONS.

Concluding Report.

THE proceedings of the opening day of the National Retail Hardware Association convention, held in Boston June 18-22, were reported in our last issue. The character of the early meetings, the size and quality of the attendance and evidence of painstaking work on the part of the Committee of Arrangements—all gave promise of a successful and profitable week, which was amply fulfilled. The meetings were well attended and were noteworthy for the intelligent and comprehensive discussion of many practical subjects now before the trade. A number of suggestive and ably prepared papers were read, several of which are given in the following pages. Questions were not always viewed from the re-

tailers' standpoint only, but were considered with a fair-minded respect for other interests involved.

Entertainment.

Owing to the special attractions of Boston as a convention city many of those who attended the convention brought with them their wives or other members of the family, making up quite a large delegation of ladies, who proved to be exceedingly congenial and by whom it is safe to say all the sight seeing trips arranged and entertainment features provided were greatly enjoyed. Many parties were made up to visit points of historical interest,

while there were also excursions to Revere and Nantasket Beaches, a clam bake, an evening in Symphony Hall at one of the Boston "Pop" concerts, and the banquet.

The latter function was preceded by a reception and promenade concert and was enlivened by an orchestra and a ladies' quartet. A number of excellent speakers were heard, including President J. B. Hunter of the New England Hardware Dealers' Association, who acted as toastmaster; President E. M. Bush of the National, Postmaster G. A. Hibbard of Boston, B. F. Trueblood, secretary of the American Peace Society, and Rev. E. A. Horton, chaplain of the Massachusetts State Senate. Perhaps the feature of the occasion was a most graceful address of welcome on the part of the local ladies by Mrs. S. H. Thompson of Lowell, Mass., who, by her eloquence, wit and personal charm, exemplified the culture and intellectual power for which Massachusetts women are justly famed.

Other entertainment features included an Indian supper so-called for gentlemen, which was held at the American House Thursday night, an occasion of informal jollification which will not soon be forgotten by the participants.

A Notable Attendance.

In addition to the full quota of delegates from the various State associations, as given below, there was a goodly representation of retail merchants who, though not accredited delegates, took advantage of the opportunity to visit Boston and attend the convention. The jobbing trade was represented by a number of prominent members, especially from Eastern houses, while the list of manufacturers, their salesmen and agents was an imposing one and covered nearly all sections of the country. Among the prominent guests were noted W. G. Smythe, American Screw Company, Providence; Geo. W. Corbin,



S. R. MILES,
President.

Union Mfg. Company, New Britain; Wm. M. Pratt, Goodell-Pratt Company, Greenfield, Mass.; G. H. Jantz, American Wringer Company, New York; S. Norvell, Norvell-Shapleigh Hardware Company, St. Louis; S. A. Bigelow, Bigelow & Dowse Company, Boston; L. H. Pease, Stanley Works, New Britain; T. James Fernley, Philadelphia, secretary-treasurer of the National Hardware Association, and others.

Delegates Present.

The list of delegates present was as follows:

ARKANSAS: E. E. Mitchell, Morrilton.
COLORADO: Adolph Unfug, Walsenburg.
CONNECTICUT: J. De F. Phelps, Windsor Locks; George J. Bassett, New Haven.
GEORGIA: G. W. Woodruff, Winder.
INDIANA: S. E. Jones, Richmond; C. E. Hall, Indianapolis; J. L. Fulton, Portland; Albert De Prez, Shelbyville; M. M. Hamilton, Brownstown; William A. Shipley, Lafayette; Charles B. Frame, North Manchester.
ILLINOIS: T. J. Mathews, Mt. Vernon; E. L. Sommers, Chicago; L. D. Nish, Elgin; H. G. Cormick, Centralia; C. H. Williams, Streator; G. R. Lott, Chicago; H. E. Gnadtt, Chicago; Grant Porter, Chicago; William Bittel, Peoria; L. D. Ray, Belvidere; Mr. Cole, Westville.
IOWA: P. C. DeVol, Council Bluffs; H. S. Vincent, Fort Dodge; L. C. Abbott, Marshalltown; C. E. Haas, Le Mars; J. F. Doty, West Liberty; F. R. Currie, Mason City; C. T. Gadd, Des Moines; A. R. Sale, Mason City.
KENTUCKY: J. R. Sower, Frankfort; B. J. Durham, Danville.
MICHIGAN: A. J. Scott, Marine City; E. B. Standart, Holland.
MINNESOTA: Charles F. Ladner, St. Cloud; Elmore Houghtaling, Fairmont; M. S. Mathews, Minneapolis; Julius Schmidt, Wabasha; W. H. Tomlinson, Lesueur; F. W. Lucas, Litchfield; E. H. Heins, Renville; H. Hauser, Franklin.
MISSOURI: Frederick Neudorf, St. Joseph; William H. Hahn, St. Louis.
NEBRASKA: Frank Hacker, Friend; Nathan Roberts, Omaha; J. Frank Barr, Lincoln; H. J. Hall, Lincoln; Daniel Kavanaugh, Fairbury.
NEW YORK: L. G. Mattison, Newark; John E. Larrabee, Amsterdam; A. E. Towne, Saratoga Springs; Louis J. Ernst, Rochester.

OHIO: John F. Baker, Dayton; W. P. Bogardus, Mt. Vernon; Frank A. Bare, Mansfield.

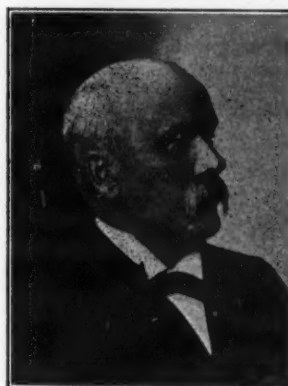
NORTH DAKOTA: H. F. Emery, Fargo; W. R. McIntosh, Bottineau; C. N. Barnes, Grand Forks.

PENNSYLVANIA: J. E. Digby, McKees Rocks; W. V. Taylor, Allegheny; George L. Moore, Brownsville; William Mendenhall, Montoursville.

SOUTH CAROLINA: M. Bonnoitt, Darlington.

SOUTH DAKOTA: E. D. Hawkins, Vermillion; H. E. Johnson, Woonsocket.

WEST VIRGINIA: F. R. Clelland, Fairmont; T. B. Frye, Keyser; J. H. Krepps, Morgantown.



A. T. STEBBINS,
First Vice-President.



CHAS. H. WILLIAMS,
Second Vice-President.

WISCONSIN: J. Kornely, Milwaukee; James Murphy, Racine; C. A. Peck, Berlin; O. P. Schlafer, Appleton; E. H. Ramm, New London; O. B. James, Richland Center.

Convention Committees.

The following committees were announced by President Bush:

AUDITING: Messrs. McNamara, Wisconsin; Wolbert, North Dakota; Hall, Nebraska; Abbe, Connecticut; Hall, Indiana.
CONSTITUTION AND BY-LAWS: Messrs. Abbott, Iowa; Cormick, Illinois; Jones, Indiana; Baker, Ohio; Abbe, Connecticut; Ernst, New York; Mendenhall, Pennsylvania; Sower, Kentucky; Schlafer, Wisconsin; Stebbins, Minnesota; Helgeson, North Dakota.
PRESS: Messrs. Chandler, Massachusetts; Bare, Ohio; Bogardus, Ohio; Emery, North Dakota.
LEGISLATION: Messrs. Williams, Illinois; Bare, Ohio; Hauser, Minnesota; Digby, Pennsylvania; Phelps, Connecticut; Johnson, South Dakota; Barnes, North Dakota; Nish, Illinois; Foley, New York; Shipley, Indiana; Murphy, Wisconsin.
RESOLUTIONS: Messrs. Fulton, Indiana; Haas, Iowa; Houghtaling, Minnesota; Hawkins, South Dakota; Porter, Illinois; Moore, Pennsylvania; Bassett, Connecticut; Ray, Illinois; McIntosh, North Dakota; Roberts, Nebraska.
SUGGESTION AND WORK EXTENSION: Messrs. Bogardus, Ohio; Tomlinson, Minnesota; De Prez, Indiana; Bittel, Illinois; De Vol, Iowa; Standart, Michigan; Mitchell, Arkansas; Sommers, Illinois; Ramm, Wisconsin; Frye, West Virginia.
INSURANCE: Messrs. Bogardus, Ohio; Simpson, Pennsylvania; Mathews, Minnesota; Peck, Wisconsin; Sale, Iowa; Barr, Nebraska.
STATE CONVENTION DATES: Messrs. Bare, Ohio; Nish, Illinois; Sale, Iowa; Hahn, Missouri; Corey, Indiana; Foley, New York; Clelland, West Virginia; Unfug, Colorado; Woodruff, Georgia; Bonnoitt, South Carolina; Hauss, Illinois.
PRICE REVIEW AND REPRESENTATION: Messrs. Miles, Iowa; Currie, Iowa; Sale, Iowa; Doty, Iowa; Abbott, Iowa.
FINANCE: Messrs. Rockwell, New York; Barber, Massachusetts; Larrabee, New York; Mathews, Illinois; Gadd, Iowa; Lucas, Minnesota; Cole, Illinois; Hacker, Nebraska.
PLACE OF MEETING: Messrs. Kornely, Wisconsin; Bittel, Minnesota; Hamilton, Indiana; Towne, New York; Durham, Kentucky; Lott, Illinois; Taylor, Pennsylvania; Neudorf, Missouri; Heins, Minnesota; Unfug, Colorado; Scott, Michigan.
NOMINATING: Messrs. Vincent, Iowa; Ladner, Minnesota; Frame, Indiana; Peck, Wisconsin; Hunter, New England; Mattison, New York; Kavanaugh, Nebraska.

E. H. Mansfield, Boston, was appointed sergeant-at-arms.

Control of State Convention Exhibits and Programmes.

It was brought out that some State associations have in the past farmed out their advertising programmes either to individuals or some advertising syndicate, a practice which has proved unsatisfactory, and in some cases worked injustice to advertising patrons. The following resolutions were adopted:

Resolved, That we recommend to each State association that they control the exhibits of their State conventions and control and issue their own programmes.

We recommend that in the future all advertising in programmes be left in the hands of each State association, and that contracts for programme advertising be only made direct from each State secretary's office with the advertising patron.

Report of Legislative Committee.

The special committee appointed to consider legislative questions submitted an able report. After a preamble deploring the present tendency toward class legislation, &c., and the crude and ill-advised efforts of short-sighted reformers to seek legislative remedies for all real or imaginary trade evils, the committee declared itself in favor of the following:

1. A law prohibiting false advertising and the use of the mails for its distribution.
2. The reduction of postage on first-class mail matter to 1 cent.
3. A reciprocal demurrage law as outlined by the National Manufacturers' and Jobbers' associations.
4. The repeal of the national bankruptcy law.

The committee expressed the belief that more effort will be constantly needed to prevent unfair and special



M. L. COREY,
Secretary.



H. L. McNAMARA,
Treasurer.

class legislation than in the furtherance of desirable legislation, and recommended that each State Secretary keep a list of members in each Congressional and Representative district who pledge themselves to write letters for or against proposed measures at the request of the State Secretary. The committee urged continued vigorous opposition to the Parcels Post bill. It also recommended that all members of Hardware associations do their duty as citizens by taking an active interest in their party primaries, with the object of increasing their influence and acquaintance with legislators.

In Memory of T. Frank Ireland.

The late T. Frank Ireland, Belding, Mich., who died during the past year, was sadly missed by attendants at the convention. His commanding figure and personality have been familiar to many Hardware gatherings, and his sage counsels and unselfish labors on behalf of retail interests endeared him to all with whom he was associated. Formal resolutions were adopted by the convention expressing grief at his loss and sympathy for his family.

Uniform Size of Pamphlet Catalogues.

There was evidence of the growing desire on the part of retail merchants to reduce the difficulty and inconvenience of accommodating trade pamphlets, &c., hundreds of which are received by every merchant during the year. The following resolution on this subject was adopted:

Whereas, The lack of uniformity in the size of pamphlet Hardware catalogues is a source of serious annoyance to the Hardware dealer,

Resolved, That we recommend the adoption by all manufacturers and jobbers, so far as possible, of a uniform size, approximately 6 x 9 in., for all unbound Hardware catalogues of pamphlet and circular class.

Advertising on Freight Cars.

Following the recent agitation of the Joint Catalogue House Committee against railroad companies allowing the use of the outside of their freight cars for advertising purposes the following resolution was adopted:

Whereas, The question of railroads permitting the use of their cars for advertising purposes has been prejudicial to the business interests of the masses and only favors the few;

Whereas, The railroads are public carriers doing public service; therefore be it

Resolved, That in our opinion the practice is wrong in policy,

and we do hereby petition the railroads of this country to desist from permitting the use of their cars for advertising purposes when such cars are in use for transmission of freight and other public service.

Mutual Fire Insurance.

A strong argument for Hardware mutual fire insurance was delivered by W. P. Bogardus, who brought out forcibly the practical value of this form of insurance for the Hardware trade, and submitted figures showing the thriving condition of the National as well as the various State companies. Mr. Bogardus was followed by C. H. Miller, Huntingdon, Pa., president of the National Hardware Mutual Fire Insurance Company, who briefly stated the claims of the company for the support of the trade.

Postal Questions.

There was less discussion of postal questions at this convention than has been the case for several years, a fact probably due to the excellence of the organization which has been effected to defeat the Parcels Post bill and the successful work that has been done. Parcels post, however, was still recognized as an impending evil, and resolutions were adopted reaffirming the association's opposition to this bill, and favoring a reduced rate on first-class mail matter.

A special resolution was also adopted expressing the sympathy of the association with the American Society of Equity, and the desire to co-operate with it in the furtherance of its objects.

Trade Boundaries.

H. T. Helgeson, Milton, N. D., was expected to make an address on the subject of "Trade Boundaries," but was unable to be present at the convention. Remarks were made on this subject by G. W. Wolbert, Bismarck, N. D., who was also chairman of a special committee to confer with certain manufacturers and jobbers as to the distribution of merchandise through other than "legitimate" channels. Special attention was paid to the methods of salesmen of some houses who, on going to a town and finding that they cannot place their line with established Hardware merchants, sell small quantities to lumber dealers, grocery or general stores, or even direct to consumers, thus demoralizing for a time at least the trade of Hardware merchants in that locality. The convention adopted the following resolution:

Resolved, That it is the wish of this association that all jobbers and manufacturers confine their sales in towns where there are exclusive Hardware stores to such Hardware dealers, and that they cease selling any other parties in these same towns.

Publicity Advertising.

The subject of publicity advertising by manufacturers was introduced by F. R. Currie, Mason City, Iowa, whose able paper was quoted in our last issue. General discussion of this matter followed Mr. Currie's address, and indeed it came in for a great deal of attention throughout the week. There seems to be a very strong feeling on the part of many retailers that advertising by manufacturers direct to the consumer is more or less inimical to their interests and that the results so far as the retail trade is concerned are inconsiderable. Evidence was also offered that results to the manufacturer were not sufficient to justify the enormous expense. It was strongly suggested that lavish advertising campaigns of this character could not fail to increase the cost of goods, with the probable result of reducing the profits of the retail merchant.

The point was made that some manufacturers take this means of forcing the trade to handle new lines, but although it was admitted that the trade would not buy new lines until there was a demand for them it was not brought out what other means the manufacturer could use to accomplish this end.

Special attention was paid to the subject of substitution, against which practice on the part of merchants a campaign is now being waged by various general periodicals. It was argued that one store cannot possibly be expected to carry all lines on the market and that a merchant's standing in his community should be such that consumers would accept the brand he recommended on the strength of his own business reputation. The following resolutions relative to this subject were adopted:

Whereas, There is an expressed purpose on the part of various weekly and monthly popular magazines to create an exclusive prejudice in favor of their advertisers—whether based on absolute and long established merit or not—and as against any article offered for sale but not advertised in their pages; and

Whereas, Such practice is unfair and unjust in principle and in ethics, be it

Resolved, That we as a body protest against any such statements being promulgated, and that we request advertisers to discontinue such statements and request a discontinuance of the practice.

Transportation Problems.

As has been the case in most recent trade conventions problems connected with the transportation of freight came in for much attention. The association was fortunate in securing Edgar Van Etten, vice-president of the New York Central & Hudson River Railroad for an address on the subject, "The Ethics of Rate Making." Coming from an able man of long practical experience, the remarks of Mr. Van Etten were received with the greatest attention and manifest approval. He demonstrated in a graphic way some of the problems entering into the question at issue, which make it one not to be summarily settled by sensational writers or partisan shippers who do not know the first principles of railroad operation. By concrete examples, he explained the process of affixing traffic charges proportionate to the value of service rendered, and it is safe to say that some of the problems which he suggested and the considerations which he showed to be involved were a revelation to many of his listeners.

Another phase of the transportation problem was introduced through an address by J. A. Fox, Blytheville, Ark., of the National Rivers and Harbors Congress. Mr. Fox made an eloquent plea for the extension and improvement of our harbors and waterways, especially as regards the interior rivers which, he declared, if properly improved and utilized, would go farther toward the solution of transportation difficulties, freight rates and traffic congestion than any effort otherwise directed. It was recommended that the association take steps to become a member of the National Highway and Waterway Commission. The following resolutions on this subject were also recommended and adopted by the convention:

Whereas, The National Retail Hardware Association is, as a body of business men, directly interested in matters pertaining to traffic and transportation and is entitled to consideration in expressing itself upon economic questions; and

Whereas, The question of traffic congestion and cheap transportation are now disturbing the horizon of our present prosperous condition and merit due consideration; and

Whereas, The output of our products has so rapidly exceeded our railroad facilities for hauling them and promises to be even more greatly exaggerated by the construction of the Panama Canal and the promise of increased commercial relations with the South American countries; and

Whereas, The speedy, comprehensive and systematic improvement of our magnificent system of natural waterways and the deepening of our harbors will serve to materially relieve possible future congestion and insure regulated freight rates by natural competition; therefore be it

Resolved, By this association in annual convention assembled this 20th day of June, 1907:

1. That we strongly urge and recommend the adoption of such a policy on the part of the National Government as will lead to the speedy, systematic and comprehensive development of our water facilities, to the end that they may become effective carriers of freight and natural regulators of rates.

2. Resolved, That we highly commend the timely and efficient work of the National Rivers and Harbors Congress in its efforts to bring about such a policy, and strongly indorse their crusade for larger and more regular river and harbor appropriations for such improvements.

3. Resolved, That copies of these resolutions be sent to the Hon. Theodore Roosevelt, President of the United States; to the Hon. Joseph E. Ramsdell, president of the National Rivers and Harbors Congress, and to every member of the Senate and House of Representatives of the United States.

Election of Officers

To the broad gauge ability and the disinterested efforts of its past officers, the National Retail Hardware Association owes much of its growth and present success. Among those who have from its foundation taken the most lively interest in its welfare and given lavishly of their time and personal effort, none is accorded greater honor than President E. M. Bush, Evansville, Ind., who presided at this convention and retired at its close. Mr. Bush was succeeded in his high office by S. R. Miles, Mason City, Iowa, a man who has from the first been identified with the association movement, and brings to the position eminent qualifications which promise great things for his administration. Mr. Miles is a man of great executive ability, tireless energy and broad views. The association is to be congratulated on his acceptance

of the office, in view of the fact that the duties will for the time at least be especially onerous to him because of the severe fire which has just visited his store. We give below the complete list of officers elected for the ensuing year:

PRESIDENT, S. R. Miles, Mason City, Iowa.

FIRST VICE-PRESIDENT, A. T. Stebbins, Rochester, Minn.

SECOND VICE-PRESIDENT, Chas. H. Williams, Streator, Ill.

SECRETARY, M. L. Corey, Argos, Ind.

TREASURER, H. L. McNamara, Janesville, Wis.

EXECUTIVE COMMITTEE: Nathan Roberts, Nebraska; Frank A. Bare, Ohio; Sharon E. Jones, Indiana; F. Alex. Chandler, Massachusetts; George W. Woodruff, Georgia.

St. Louis Next Year.

It was learned early in the week that the committee on next place of meeting would report in favor of Milwaukee as the scene of next year's convention, as noted in our last issue. In addressing the convention at one of its opening sessions, however, S. Norvell of the Norvell-Shapleigh Hardware Company, St. Louis, Mo., expressed regret that this decision had been arrived at and said that he was commissioned by the St. Louis jobbers acting in concert to invite the association to hold its next annual gathering in their city. When the subject came up for final discussion and vote it was found that a very strong sentiment had developed in favor of accepting Mr. Norvell's invitation, a feeling which may be understood from the fact that in addition to promising ample funds for expenses, entertainments, etc., he stated that delegates to that city should have, among other inducements, free passes on all street car lines, passes to every theater in the city, passes on every steamboat line, and passes to every summer garden. Other cities besides Milwaukee whose claims were presented included Denver, Detroit and Little Rock, but the vote was overwhelmingly in favor of St. Louis.

Resolutions of Thanks.

In the report of the Committee on Resolutions, much of which has been quoted under the various topics to which the resolutions referred, thanks were formally extended to all who aided in the success and pleasure of the convention, including the Mayor of Boston and other officials, the ladies of the Reception Committee of Boston, the officers and committee of the New England Association, the retiring officers and the trade press. Special resolutions of thanks were passed to Mr. Van Etten of the New York Central Railroad for his address on rate making and to R. R. Williams, Hardware editor of *The Iron Age*, who spoke on the trade press.

In recognition of the address on "Universal Peace," delivered at the banquet by B. F. Trueblood, a resolution on this subject was adopted especially favoring the neutralization of private commerce and cabled to the Hague peace conference.

The "Chicago Special."

The "Chicago Special," which has come to be regarded as a feature of all national Hardware conventions, held in the East, was run as usual under the direction of W. H. Bennett, Lawson Mfg. Company, Chicago. It carried about 100 of the Western merchants with members of their families. The journey was a delightful one, being broken by a Sunday at Niagara Falls, where lavish entertainment was provided by the Oneida Community, the Carborundum Company and other local concerns. Resolutions of thanks were passed by the convention for the courtesies shown the delegates at Niagara, and Mr. Bennett was presented with a handsome Masonic charm, given by the passengers on the train in appreciation of his attention to their pleasure and comfort.

The New England Association.

At the annual meeting of the New England Hardware Dealers' Association, Thursday, very little business was transacted beyond the election of officers, the result of which was printed in *The Iron Age* of last week. As the association united its convention with that of the National Association, such matters as would be embodied in resolutions, or brought up for discussion were

omitted, excepting that it was voted to increase the directorate from 12 to 17 members, though final action on the question had to be laid over until the next meeting to conform with the by-laws. It was urged that the New England Association give greater attention to the matter of mutual Hardware insurance, either by the establishment of a New England company, or the dissemination of the merits of the established companies.

The members of the New England Association concentrated their efforts upon the entertainment of the visiting delegates and their friends, and with entire success, for no greater hospitality or thoughtfulness could have been shown. But at the same time they took a very active interest in the convention business. The New England meeting was made subordinate so far as discussions and the like were concerned, because of the larger field of work which the national body represented in its gatherings. The growth of the local association was a matter of much congratulation, its membership having practically doubled within the past year.

Secretary Corey's Report.

M. L. Corey made an interesting and suggestive report as secretary. In opening the report he said:

Without exception this has been the most prosperous, as well as trying, year in our association experience. Even in our early and darkest days, when our numbers were small and our debts big our difficulties were clearly defined and our opposition depended upon its own strength and resources. The year has demonstrated that our membership is loyal and united; that they will not desert when danger threatens; that they are strong in defense and have confidence in their national officers.

Opposition Has Welded Our Affiliated States

more closely together, while the necessity and advantage of retail Hardware organization is becoming more apparent every day. Old members that had grown indifferent and dropped out of our associations are asking for reinstatement. New applications come easier than ever before, while nearly every unorganized State is calling for information and assistance.

Never in our opinion was there a more critical period for the retail merchant. The next decade will witness great changes, and it seems to me the time has come when retail associations should look forward and discover

The Trend of the Influences

that are responsible for the so-called trade evolutions, instead of allowing them to become established, thereby continually keeping us busy in defense and readjustment of our retail system. This does not mean that we should stand still or should not improve. It means that we should emphasize the retailers' standard of quality, truth, honesty, prompt service and general community advancement, as against cheapness, deception, misrepresentation and concentration of trade and capital.

New trade problems are being brought before this convention; their importance and bearing upon the retailers' future has not been generally recognized, not clearly defined. Their tendency and direction can, to a great extent, be guided by your decisions.

Among other matters touched upon in the report were the suit brought by Montgomery Ward & Co. against the South Dakota Retail Merchants' Association some months since, which resulted in favor of the association, as pointed out at length in these columns at the time; the failure of several catalogue houses during the past year, the advisability of joining the national freight service association, price agreements, rebates, &c.

Mr. Corey also presented the following synopsis of the membership of the National Association and the State associations affiliated with it:

State.	Member-ship.	New mem-bers.	State.	Member-ship.	New mem-bers.
Ohio	1,266	284	Arkansas	215	12
Illinois	1,100	347	Colorado	193	37
Indiana	854	132	Carollnas	190	75
Michigan	818	73	Missouri	177	15
Minnesota	790	42	Kentucky	175	24
Iowa	740	136	South Dakota	134	134
Wisconsin	650	122	Georgia	100	90
New York	490	65	Connecticut	83	8
Nebraska	476	128	West Virginia	51	51
Inland Empire	326	240	Pennsylvania	267	*
North Dakota	301	100	New England	128	*
Oklahoma	240	40			
Totals				9,764	2,156

* Not reported.

Mr. Corey said that about \$100,000,000 was invested in business by the members of the National Association, whose gross sales amounted to \$250,000,000 a year.

CONVENTION NOTES.

The whole convention received a blow on Thursday morning when news came over the wire that the fine new store of Vice-President S. R. Miles, Mason City, Iowa, now president-elect, had been practically destroyed by fire. It may almost be said that plucky Mr. Miles was the least disturbed of all, for every one present seemed to feel that he had suffered a personal misfortune, and expressions of regret and sympathy and offers of assistance were almost overwhelming. When the news reached the convention hall a committee was immediately appointed to convey to Mr. Miles officially the sympathy of the association. In spite of his loss and the Herculean job ahead of him of rebuilding and restocking his store, Mr. Miles stayed through the convention and accepted the honor of the presidency, to which it was recognized by common consent he was justly entitled. In the early weeks of his administration, while overburdened with his personal cares, President Miles is promised the most active support from his brother officers.

The hardest worked man in Boston was F. Alexander Chandler, secretary of the New England Association, who seemed to occupy the position of master of all ceremonies and arrangements on behalf of the local entertainers. Mr. Chandler's labors in preparation for this convention and during its sessions were tireless, and unstinted credit was accorded him for the success of the numerous functions that he had in charge. In appreciation of his unselfish labors, his associates on the local committee presented him with a handsome hall clock.

One of the best souvenirs of the occasion was a guide book to Boston, containing a complete programme for the convention, which was issued by the local committee. This guide book is gotten out by a well known firm of publishers, and a special edition was issued for the present purpose. It was substantially bound in black leather and it is safe to say will be preserved by all the visitors from other places, not only as a memento of the occasion, but as a handbook of valuable historical information about Boston and its environs.

A courtesy greatly appreciated and made use of by nearly all attendants at the convention was the free use of the lines of the Western Union Telegraph Company and the New England Telephone & Telegraph Company and the American Bell Telephone Company. Resolutions were passed expressing the thanks of the delegates to these companies for their attention.

Many of the visitors took advantage of the opportunity to spend Saturday and Sunday in Boston or some other New England point, and accepted the invitation of the New Britain Hardware manufacturers to visit their city and works on Monday following the convention. Arrangements for the trip were admirably made and carried out, and a formal resolution of thanks for the proffered entertainment was passed by the National Association.

Those who were in Boston Monday saw the celebration of that unique holiday, Bunker Hill Day, which the city and its suburbs celebrate after the manner of the Fourth of July. There was general sightseeing, and a number of the visitors were taken for an automobile ride, visiting a number of the attractive suburbs.

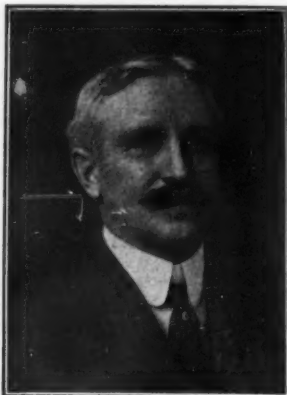
RELATIONS BETWEEN DEALERS AND MANUFACTURERS.

The following paper on trade relations was read by J. H. Drury, of the Union Twist Drill Company, Athol, Mass.:

This subject is one of many, the outcome of deliberations between associations of dealers and associations of manufacturers. The subject is a simple one, and it may be reduced to the two words, Mutual Interest, or Mutual Profit.

The dealers' associations are to a great extent responsible for the creation of the manufacturers' associations; and the fact that the American Supply & Machin-

ery Manufacturers' Association, an association comprising the leading manufacturers of goods sold by supply dealers, made a gain of 100 per cent. in its membership the past year is worthy of your attention, showing that the manufacturer is fully alive to the benefits to be obtained through associations. As you may know, this association is committed to the policy of protecting the dealers. As my experience has been among the dealers in supplies, what I have to say is of course more pertinent to that portion of your business.



J. H. DRURY.

The Manufacturer is Interested

In distributing his product by the least expensive and most satisfactory method, and it is generally conceded that the best results are obtained through the channels of the regularly established Hardware and supply dealers. When a manufacturer solicits the assistance of a dealer in the distribution of his product he assumes an obligation, without any mental reservations. This obligation should consist of a purpose to work, with the dealer, by the dealer, and through the dealer; helping to a better knowledge of his product; careful attention to orders; maintenance of price, and protection as to territory. Maintenance of price is probably the most important, since it affects mutual interest.

There are many well-known manufacturers who have always followed this policy. There are many more, and the number is increasing, who appreciate the desirability of such a policy, and this increase in numbers is brought about largely by that branch of association work which shows manufacturers that their interests may be safely intrusted to the dealers.

Merchant's Obligation.

Now for the dealers: When a dealer adds a line of goods he also assumes an obligation, and this obligation should carry the purpose to approximate as nearly as possible the condition that would exist were the manufacturer represented by his own store. Occasionally there are complaints among the manufacturers, such as the lack of practical knowledge of the manufacturers' product; a disposition to accept the criticisms or complaints of customers; replacement of goods without cost; a tendency to make reductions from established resale prices, without due consideration of the manufacturers' interest.

The lack of knowledge of goods can be easily supplied. Manufacturers are usually ready to furnish ample information. The replacement of goods without cost should be carefully considered; the maintenance of price is a tribute to salesmanship.

System of Apprenticeship.

Many of the present difficulties may be overcome through salesmanship: this naturally brings into the question the better training of young men. From many years of observation, it has seemed to me that a regular system of apprenticeship should be established or suggested by your association. It would bring results more satisfactory to yourselves, the manufacturers and your customers.

You all know that some manufacturers are disposed to sell direct to the user at prices which do not allow the dealer a fair margin of profit, even while they encourage the dealer to carry a stock of goods. Their number, however, is growing less, and you can make it still less. The remedy lies in your own hands. Support those manufacturers in a practical way who are committed to a policy of supporting the dealers. Show them you can take care of their interests. You will find them appreciative and responsive. Get closer together, study conditions, keep up your good work of Mutual Interest. Don't expect to correct all the little evils at once.

SALESMANSHIP TRAINING.

A paper on the training of Hardware salesmen was read by F. Alex. Chandler, Boston, in part as follows:

The matter of special attention to salesmanship training came up last fall to our firm through solicitation from one of the many theoretical schools who wish to furnish education by correspondence, and it is without any intention to injure whatever good there may be in such system that I remark that this line of procedure did not meet at all with the approval of our people.

We did, however, have a general lecture outlining the course by a representative from the school and arranged a very liberal offer of sharing the expense with our people should they care to enter upon the course; but it was the almost universal opinion that the course would not appeal or work out to our advantage, and, therefore, we took up the matter along lines of our own. As a consequence of our decision, we started in immediately with

A Course of Bi-weekly Meetings.

to which all of our people, from the youngest entered apprentice to the senior member of the firm, were invited. Attendance was not compulsory or urged. We have averaged between 87 and 90 per cent. attendance throughout the entire course, the average being brought down a few points on account of the unavoidable absence of some of the traveling men.

Our boys assembled 15 min. after closing hours in the private dining room of a nearby restaurant, where our firm served a good old-fashioned home supper, which was given complimentary. After the meal one or two factory representatives were introduced, who had samples showing the method and different stages of the process of manufacture, and all of whom spoke in a very comprehensive and concise manner. We had a permanent secretary who acted throughout the course, the chairman being changed each evening and elected by acclamation. Following the discourse we had an open question box, and I assure you that many of the questions put by our youngest employees showed that careful thought and attention which I have even heard older men fail to express.

An Evening at the Factory.

During the winter one of our factory people located 56 miles from Boston, insisted that we have our evening there and being unable to establish regular train service, we chartered a special train, had lunch on the way down, were met at the station by special trolley cars and escorted through the factory in groups of four, in charge of a competent demonstrator. We saw the entire process of the manufacture of Twist Drills and Reamers, and then retired to the reception or exhibition room, where a collation was served.

Another meeting was held at one of our factories 25 miles from Boston, where we traced the manufacture of Taps and Dies.

Now, we did not pursue this course through any desire of advertising or to pose as charity workers, but it is the policy of our house to give all of our men a fair show, and if new goods are to be shown or points to be given on general lines we stand ready at all times to impart full information to our salespeople, and believe that this method has proved not only very satisfactory to ourselves, but to our customers. We also develop and encourage in the store

A Spirit of Cheerfulness.

and I think that I do not speak selfishly when I say that I believe we have an exceptionally sunny corps of people, and it certainly is very gratifying to be an officer and co-worker with such a body of men and boys; and it appears to me strange that some men who have attained the privilege of being able to hang out a sign as Hardware merchants, should have to be urged to join an association and attend meetings, and shown wherein dollars are coming back for the few cents spent, before they will affiliate with their fellowmen and give and take information and experience at these conventions. It certainly seems to me that if we are up to date and meet and mingle and broaden ourselves and then in turn return home and impart some of the enthusiasm and education to our men, we will not only be bigger men in our trade and community, but have a larger feeling of personal gratification as we enlarge our own possibilities through the larger development of the qualities which are born in us.

Obstacles Should Be an Incentive.

There are two kinds of persons in the world, those who think first of difficulties, and those who think first of the importance of accomplishment in spite of difficulties. If a thing ought to be done, the presence of severe obstacles to its doing is only a further reason for bringing it to pass. Yet the trait of instantly showing why a thing cannot be done is keeping down more young men



F. ALEX. CHANDLER.

and older, too, in business than any other factor in their lives.

Anybody can point out difficulties, but it calls for brains and courage to look beyond difficulties to the end. If you want to stay just where you are in the procession or fall steadily behind, give obstacles a first place in your life. If you want to move out from the crowd and count for something more than average, let every obstacle be welcomed as a fresh incentive to action.

NEED OF ORGANIZATION AMONG SOUTHERN HARDWARE MERCHANTS.

This was the subject of a paper by E. E. Mitchell, Morrilton, Ark., a portion of which we give below:

My subject, the organization of the Southern States, is a very broad one. You would not want to capture a territory without first knowing what it contained, and its possibilities. The farmer first, before clearing his fields for cultivation, goes over the ground carefully, examining the soil, drainage, &c., to ascertain whether it is worth the expense of putting it in a state of cultivation.

What Is This Southland

that we wish to organize? It is a land that produces nearly everything, from the widest range of agricultural growth to the widest limit of manufacturing and mining diversity, at the lowest cost. It produces 80 per cent. of the world's cotton. Its coal and iron ore, the supply of which is unlimited, are found so convenient, one to the other, and the cost of mining is so low that Pig Iron and Steel can be made at a smaller cost than anywhere else in the world. It promises soon to be the great Iron and Steel center.

The fruits and vegetables of the South take first prize wherever they are exhibited, and she is fast becoming the market garden of the North. Strawberries, peaches, apples, potatoes, &c., are shipped in solid train loads from small towns in my State to the North and East.

About 50 Per Cent. of the Standing Timber

of the United States is found in the South. In Arkansas there is timber yet standing beyond the echo of the woodsman's Axe which, if manufactured into lumber and sold in the market to-day, would produce a sum sufficient to buy a sister State, even in New England, at its tax book values.

Some countries have Lead and Zinc, some Coal and Iron, some Granite and Marble, some Oil and Gas, some Phosphate. Some have good agricultural lands, some a good climate, some have water power, some have other advantages, but no other place on earth can boast of having all these things combined, except the southland, and to them add cotton, which is the foundation of one of the greatest manufacturing interests in the world.

No other country can boast of as many rivers, which means fertile valleys and abundance of the best water power. These rivers and her long seacoast are a guarantee of lowest freight rates, and give it greater advantage for the profitable utilization of its natural resources than any other country on earth.

Its Climate

is conducive to good health and long life. People sometimes die of old age in the South as everywhere, but my observation is that it takes them much longer to do it. Climate attractions, together with such health resorts as Hot Springs, Ark., the Carlsbad of America, is making the South a winter home for the ever increasing thousands of tourists and health seekers every year. The unnumbered summer resorts scattered all over her mountain tops, with their potash, sulphur, lithia, and all kinds of mineral waters, make her equally popular as a summer home for the same class of people.

National Association Should Take the Initiative.

It is good to associate with such merchants as these and have them a part of this association. I believe with a little systematic work on the part of this association we can have an organization in every Southern State, and would suggest that your officers get in touch with a few of the leading Hardware men in each State through the jobbers doing business there. Then get one of these men to confer with the others and fix a time and place to meet, and issue a call and write to every Hardwareman in the State to come to that meeting; also to the

leading jobbers doing business in these States, and ask them to instruct their traveling salesmen to talk up the meeting, then send to their aid at the appointed time a man like M. L. Corey or W. P. Bogardus, or a better man if you have him, but these two are "all wool and a yard wide," and good enough for me. They both helped our association.

It is very important that the Southern States organize and become members of the National Association, as there is more Hardware handled by other than Hardware stores in that section than most any part of our country, and we need the help and co-operation of the members of this association in many ways to correct this evil.

RESULTS, PRESENT AND FUTURE, OF ASSOCIATION EFFORT IN THE EAST.

A paper on the above subject was read by Jas. De F. Phelps, Windsor Locks, Conn. Mr. Phelps said, in part:

The results from organization are many more than it is possible to enumerate definitely. In the East we have become thoroughly acquainted with the fact that first of all by reason of our association we have got together and found that the other fellow is a royal good fellow as a rule. Before this he was just a competitor of ours, one stone in the wall that stood in the way of our success that it seemed necessary to remove or crush in order that we might gain the goal of our ambition.

The Twofold Purpose of Our Associations

is first to promote social interest and a better understanding by getting together so that we can be keen but honorable competitors and also the best of friends every day in the week, for in this day of tremendous energies every man must meet with his fellows to exchange ideas, and I never ran across the man yet from whom nothing could be learned; second, to educate the public to know that it takes care, skill and brains to make a good article, and that it costs a fair price.

Manufacturers of Hardware Recognize

our associations. By their attention, courtesies and endeavor they would have us understand thoroughly that they are interested in us, and that they are thoroughly alive to the fact that the Hardware associations are on earth, and that they are a factor to be considered.

While it's true that the present method of distributing some lines of goods does not meet with our approval, it is practically certain, with our associations gaining in influence and numbers as they have been in the past few years, and with a continuance of the consistent, level-headed leadership which we have been favored with these methods are bound to change for the better.

But the results that we are especially pleased to note in the East are that the associations are making of the members who attend their meetings and take an interest in them

Better and Broader Men,

and I believe it is the broad-minded man who harvests the most bountiful crop of the good things of this world. You will generally note that this sort of a man is a winner.

The oft-repeated saying that a man is not in business for his health, I heard denounced as an erroneous one at a recent meeting of our association. It was contended that a man was in business for his health, and that the sooner the business men of our country realized it the sooner would they be on the right track, for men cannot live a life of pleasure away from business. They miss the joy of doing the intellectual and mental part of it that centers in the thought that many are dependent upon his effort, and I feel that I can safely report that the result of association effort in the East has been the laying of the foundation for a better and broaded type of Hardwareman.

And last, but not least, our existence has been the means of the National Retail Hardware Association holding its convention in our midst at this time, an event which cannot fall but to stimulate more earnest effort for the welfare of the associations located in the East, which will in turn tend to strengthen the situation as a whole.



E. E. MITCHELL.



JAS. DE F. PHELPS.

EXHIBITORS.

The exhibition of the products of manufacturers was a rather elaborate one. Large rooms, constituting halls of considerable size, were provided in the American House, so that they were under the same roof with the convention hall and committee rooms and the quarters of many of the visitors. Available space was afforded for a very representative group of exhibitors, including prominent manufacturers. Products were shown with elaborate details of display. Most of the exhibitors gave souvenirs of the occasion, many of them valuable and at the same time useful. The exhibitors were as follows:

E. C. ATKINS & Co., Indianapolis: Saws. Represented by J. F. Carey, S. F. Perrigo, N. A. Gladding.
 AMERICAN STEEL & WIRE COMPANY, Chicago: Fencing. Represented by A. L. Dietrich, J. W. Meaker, Jr., J. G. Fletcher.
 ALUMINUM COOKING UTENSIL COMPANY, Pittsburgh: Aluminum Cooking Utensils. Represented by R. R. Mayfield.
 BROWN & SHARPE MFG. COMPANY, Providence, R. I.: Small Tools and Cutters. Represented by H. J. Grover, C. A. Ballou and G. M. Pearse.
 BAY STATE HARDWARE COMPANY, Boston, Bricard Frères, Paris, France: Builders' Hardware. Represented by F. E. Mason.
 ESTATE OF P. D. BECKWITH, Dowagiac, Mich.: Round Oak Stoves and Ranges. Represented by B. F. Almeda, A. E. Rudolph.
 BOMMER BROS., Brooklyn, N. Y.: Spring Hinges. Represented by W. H. Cutler and Gustav Bommer.
 BURDITT & WILLIAMS COMPANY, Boston, Mass., Lowe Bros. Dayton, Ohio: High Standard Liquid Paint, Little Blue Flag Varnishes. Represented by Geo. L. Paine.
 BARTHEL BLOW LAMP COMPANY, Boston: Alcohol Stoves and Torches, Kerosene Stoves and Torches. Represented by J. A. Mullen.
 CORBIN CABINET LOCK COMPANY, New Britain, Conn.: Cabinet Pad and Trunk Locks: Represented by C. H. Baldwin, W. H. Booth, R. A. Catlin and John R. Dean.
 CHANDLER & FARQUHAR COMPANY, Boston: Federal line Hardware specialties. Represented by H. P. Peabody, F. Alexander Chandler.
 CARPENTER-MORTON COMPANY, Boston: Paints. Represented by M. E. Vose, James B. Lord, James Murphy, J. W. Campbell.
 DIAMOND PASTE COMPANY, Albany, N. Y.: Represented by L. C. Hall.
 DOVER MFG. COMPANY, Canal Dover, Ohio: Asbestos Sad Irons. Represented by O. A. Keyser, A. S. Howe.
 HEATH & MILLIGAN MFG. COMPANY, Chicago: Paints. Represented by Walter L. Hendryx, Carl H. Dahl, John W. Adams, E. E. Seavey, H. J. Lake.
 HARRISON BROS. & Co., Incorporated, Philadelphia: Town and Country Paints. Represented by H. M. Gordon, W. G. McIntyre.
 HART & COOLEY, New Britain, Conn.: Steel Registers and Steel Lockers. Represented by W. E. Stevens and H. B. Stedman, Jr.
 J. B. HUNTER & Co., Boston, Coburn Trolley Track Mfg. Company, Holyoke, Mass.: Represented by J. B. Hunter.
 HIGHT MFG. COMPANY, Toledo, Ohio: Union Combination Square. Represented by H. C. Bussell.
 HUGHES ANTI-FRICTION COMPANY, Boston: Patent Axle Oils and Greases. Represented by H. L. Moody.
 H. W. JOHNS-MANVILLE COMPANY, New York: Asbestos and Magnesia Products, Packings, Roofings, Pipe Coverings. Represented by George H. Kendricks.
 LANE BROS. COMPANY, Poughkeepsie, N. Y.: Store Ladders, Coffee Mills, Door Hangers, Tackle Blocks, Wagen Jacks, &c. Represented by O. K. Raymond.
 LASHER MFG. COMPANY, Davenport, Iowa: Kitchen Kumfort Plate Scraper and Lasher's Spring-In Handle Pot Cover and Cabinet. Represented by C. W. Lasher, Jr.
 MARTIN SKATE COMPANY, Boston: Martin Folding Skate: Represented by Chetwood Smith.
 MERIDEN CUTLERY COMPANY, Meriden, Conn.: Anvil brand Cutlery. Represented by W. T. Kelley, H. G. Morse.
 MINNESOTA MINING & MFG. COMPANY, Duluth, Minn.: Crystal Bay Corundum, Sandpaper, Emery Cloth. Represented by L. J. Sands, C. M. White, S. B. McLearn.
 NORTON COMPANY, Worcester, Mass.: Grinding Wheels made of Alundum and India Oil Stones. Represented by Herbert Duckworth.
 ONEIDA COMMUNITY, Limited, Oneida, N. Y.: Animal Traps, Iron Chains, Hammock Chains, Newhouse Grizzly Bear Trap. Represented by F. H. Primo and A. E. Kinsley.
 JAMES H. PRINCE PAINT COMPANY, Boston: French Derby Paints. Represented by J. H. Crocker.
 PITTSBURGH PLATE GLASS COMPANY, Pittsburgh, Pa.: Plate Glass, Plate Mirrors, Sun Proof Paints, John's Asbestos Paint, Rennous-Kleinle Company's Brushes. Represented by C. E. Read, Jr., J. L. Blaisdell, Ralph H. Tasker.
 STANLEY WORKS, New Britain, Conn.: Wrought Steel Butts and Hinges. Represented by L. H. Pease, W. E. Stevens, H. B. Stedman, Jr., Geo. S. Hart.
 SHERWIN-WILLIAMS COMPANY, Cleveland: Paints. Represented by D. H. Thompson, R. F. Ketchum, W. H. Porter.
 SOLDERENE COMPANY, Boston: Solderene specialties. Represented by Herbert W. Smith, Alfred R. Hussey.

SIMONDS MFG. COMPANY, Fitchburg, Mass.: Simonds Saws. Represented by J. E. Kelley, W. E. Culley, G. T. Curtis, W. G. Fisher, G. W. Simonds, R. D. Baldwin.

SAMSON CORDAGE WORKS, Boston: Braided Cord, including Samson Spot Cord and Railroad Cords, solid braided Mason lines. Represented by Frank J. Coakley, Royal G. Whiting.

SIMMONS HARDWARE COMPANY, St. Louis: Keen Kutter goods and general Hardware. Represented by E. H. Simmons, F. J. Semple, A. C. Penn, C. M. Wiese, C. A. Saunders, F. G. Lefavour, C. E. Barnum, R. C. Allshouse.

L. S. STARRETT COMPANY, Athol, Mass.: Mechanics' Tools. Represented by L. S. Starrett, F. A. Ball, James D. Grant, David Findlay.

WADSWORTH-HOWLAND COMPANY, Incorporated, Boston: Liquid Paints. Represented by G. H. Kimball and Charles M. Kempton.

WHITE LILY MFG. COMPANY, Davenport, Iowa: White Lily Clothes Washer. Represented by R. P. Searle and A. F. Victor.

YALE & TOWNE MFG. COMPANY, Stamford, Conn.: Night Latches, Padlocks, Builders' Hardware. Represented by John T. Boyd, James J. Young, James Moir.

NEW CONSTITUTION ADOPTED.

The Committee on Constitution and By-Laws presented an entirely new draft of articles which after some discussion were adopted practically without amendment. While few noteworthy changes are incorporated in the constitution as adopted some points are worthy of mention, especially the fact that the treasurer is chosen by election instead of by appointment as in the past, and becomes a member of the Executive Committee; the establishment of an Advisory Board consisting of three ex-presidents of the association and the establishment of a Permanent Committee on Legislation. The following is the complete text of the new constitution and by-laws:

Constitution.

ARTICLE I.

Section 1.—The name of this association shall be the National Retail Hardware Association.

Sec. 2.—The object of this association shall be to promote the welfare of retail Hardware dealers of the United States.

ARTICLE II.

Sec. 1.—Membership in the National Retail Hardware Association shall consist of the members of any State Retail Hardware Association which shall comply with the conditions and requirements imposed by the National Association, and meets with the approval of the Executive Committee.

Sec. 2.—In States whose local Hardware associations accept as members other than retail dealers the National Association will permit such State Associations to work in harmony with it, but will accept as members of said State Association only such as are legitimate retail Hardware merchants, and their representatives in the National Association will be the same as other States.

Sec. 3.—A convention of the National Retail Hardware Association shall consist of the delegates elected by each State Association affiliated with the National Association having 100 members or less, and one additional vote for each additional 100 members or major fraction thereof.

Sec. 4.—When the delegation present is short full quota, those present are entitled to count full vote of State.

Sec. 5.—The fiscal year of the association will be governed by the date of the annual meetings called. Officers will hold their position until the annual meeting following.

Sec. 6.—The secretary shall be under the direction of the Executive Committee, and his duties shall be assigned by them. He shall receive all moneys paid into the association, turn same over to the treasurer and take his receipt therefor.

Sec. 7.—The Executive Committee shall pay the secretary and treasurer such salary as may be deemed necessary, and a sufficient bond shall be required from the secretary and treasurer, said bonds to be paid for by the association.

Sec. 8.—In case of a vacancy in any of the offices of this association the same shall be filled by the Executive Committee until the next meeting. The Executive Committee shall appoint an Auditing Committee to examine the books of the treasurer and secretary, and report the condition at next meeting of the association. A majority of the Executive Committee shall constitute a quorum for the transaction of business.

ARTICLE III.

Sec. 1.—The officers of this association shall be a president, a vice-president, a second vice-president, a secretary, a treasurer and an Executive Committee, which shall be composed of the president, treasurer, two vice-presidents and five members to be elected annually by the association, no two of whom shall be from the same State.

Sec. 2.—The president and vice-presidents, treasurer and Executive Committee shall be elected by ballot at the annual meeting of the association, and shall hold office until their successors are elected and qualified.

Sec. 3.—The secretary is an appointive officer under the control of the Executive Committee, which has power to remove him at any time.

Sec. 4.—The treasurer shall receive the funds of the association, and disburse them through vouchers signed by the president and secretary.

Sec. 5.—The secretary and treasurer shall file with the president a monthly report giving in total the receipts and disbursements of his office and such other detail work as may be of interest to the association.

Sec. 6.—The secretaries of the several affiliated State Associations, together with the National Secretary, shall constitute an advisory committee, whose duties shall be to aid each other in adjusting questions affecting our general interests and in obtaining a correct knowledge of unfavorable firms and conditions and suggesting plans and methods for effective work.

ARTICLE IV.

Sec. 1.—The regular meeting of the association shall be held annually at such place as may be designated by the association at such time as called by the Executive Committee.

Sec. 2.—The Executive Committee is subject to the call of the president or three members of said committee.

Sec. 3.—It shall be the duty of the president, or, in case of his inability to serve, of the vice-president, to exercise supervisory control over the affairs of the association, and to preside at all meetings of the Executive Committee, and to carry out and enforce all measures adopted by the association calculated to improve the condition of the Hardware business.

Sec. 4.—The presiding officer shall appoint at the annual meeting a sergeant-at-arms, who shall perform the usual duties of such officer.

Sec. 5.—A Legislation Committee of three shall be appointed by the chair.

Sec. 6.—The Executive Committee shall appoint an Auditing Committee of two members. They with the treasurer shall meet at the office of the National Secretary at least twice each year. The time for such meetings shall be designated by the president, or upon a signed request from three members of the Executive Committee.

Sec. 7.—An Advisory Committee shall be selected by the president, to consist of three National ex-presidents, eligible only as long as they remain in the retail Hardware trade.

Sec. 8.—The Hardware Bulletin Committee shall consist of three, the president, first vice-president and treasurer.

Sec. 9.—A Nominating Committee of seven shall be appointed by the chair, no two members from the same State.

Sec. 10.—The Committee on Constitution and By-laws shall be composed of the six members of the Executive Committee as provided in Article III, Section 1 of the Constitution, and the second vice-president, who shall be chairman of this committee.

Sec. 11.—Amendments to the Constitution and By-laws may be made at any regular meeting by a vote of two-thirds of the membership present, as provided by Article I, Section 4 of the Constitution. Other questions shall be decided by a majority vote.

By-Laws.

ARTICLE I.

The finances of the National Retail Hardware Association shall be provided as follows: Each State Association shall be assessed fifty (50) cents per capita for each member of said association in good standing. The above amount, together with 50 cents for the *Bulletin*, as provided in Article II, shall be remitted for the current year by the State secretaries to the National secretary not later than at least 10 days before the National Association meeting, for each member in good standing whose dues are fully paid. The State secretary shall remit to the National secretary the full amount of National dues when any delinquent member pays his State dues.

ARTICLE II.

The official publication of this association shall be the *National Hardware Bulletin*, and shall be issued monthly from the office of the secretary (the price of same being \$1 per year).

In all affiliated States the secretary of such State Association, by collecting and remitting to the National treasurer fifty (50) cents per capita, each year, may subscribe for the official bulletin for all their membership, and same will be sent regularly to the list he may furnish.

ARTICLE III.

State Associations, members of the association, shall in all official correspondence use official stationery bearing the name of the National Association, together with the name of their State Association as a branch thereof.

ARTICLE IV.

All grievances or questions that the members of various State Associations are unable to settle satisfactorily, or desire to have submitted to the National Association, shall be turned over to the secretary of this association, who with the Executive Committee shall adjust the matter, subject to appeal at the next meeting of the association.

ARTICLE V.

At meetings of the Executive Committee and all other committees the actual transportation expenses and \$5 per day shall be paid each attending member by this association.

ARTICLE VI.

Five members of the Executive Committee shall constitute a quorum for the transaction of business at any meeting.

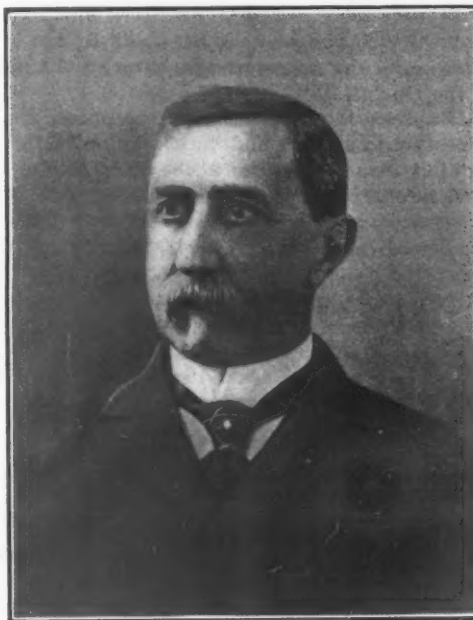
ARTICLE VII.

Representatives of a majority of the States affiliated with the National Association shall constitute a working quorum at the annual meetings.

JOHN C. KUPFERLE.

THE subject of this sketch, John C. Kupferle, is typical of the fiber that manufacturers were made of half a century or more ago; men who, possessing pioneer qualifications, blazed the way for later generations. The business, of which Mr. Kupferle is the chief, was established by him in St. Louis, Mo., in 1857, and is now a representative house in the production of Plumbers', Water Works' and Hardware Specialties.

In the early 50's and before the railroads became important in transportation, the principal mode of travel in the Ohio Valley was by steamboat, and a river trip engendered, perhaps, as marked sensations then as an ocean voyage now. Cincinnati was then the metropolis in the group of towns along the Ohio River, and there existed more or less rivalry between the cities in her class, especially such as were favored with water transportation. St. Louis, for example, nearer the frontier,



JOHN C. KUPFERLE.

was making great strides in population and commercial importance, and while there was intense competition between Cincinnati and St. Louis, there was also a large volume of business in both directions.

John C. Kupferle, a youth of 15, both a native of and resident of Cincinnati, was attracted by the possibilities of business in St. Louis, then a far Western town, and decided to locate there. Severing his connection with a comfortable, if humble, home, he arranged with a packet captain and worked his way to St. Louis. Arrived there with courage as a chief asset, he set about getting employment, and possessing mechanical talent secured an apprentice position in a brass shop conducted by an uncle, father of the present Kupferle Brothers of the Kupferle Bros. Mfg. Company, St. Louis. Young Kupferle was naturally inclined to work of this character and soon assumed leadership, easily surpassing in skill his collaborators and earning for himself a reputation as a machinist of rare qualifications. This talent developed and expanded with the lapse of time, and after some years of practical experience at the bench, at about the time he attained his majority, he established himself in the same kind of business in his own name.

Possessing only the savings from a meager salary, it necessitated unceasing toil for long hours to get ahead. Undismayed by lack of capital and spurred by latent ambition, Mr. Kupferle began then to lay broad foundations for the business which now gives him prominence as a Manufacturer of Fire and Yard Hydrants, Plumbing Supplies and goods of kindred character. His first venture was a brass turning shop at the corner of Broadway and Morgan streets, on the site of the Union market.

The measure of success secured is a notable example of what is possible with ability and pluck.

Mr. Kupferle is of a retiring and modest disposition. While not in any way ostentatious, he occupies a beautiful home on Lindell boulevard, opposite Forest Park, with his wife and one daughter, three other daughters being married. He has a summer home on the bluffs of the Mississippi River, 50 miles north of St. Louis, near the Chautauqua Assembly grounds on the Illinois side of the river, but this year he is spending the summer abroad.

Among Mr. Kupferle's factory employees are men whose terms of service aggregate from 20 to 35 years each, a fact that indicates the mutual cordial relations between employer and operatives. At the start the usual business difficulties and hardships were encountered, including a disastrous fire, which nearly put Mr. Kupferle out of business. During the late Civil War the house manufactured quantities of Saddlery Hardware, Bayonet Tips and other appliances, and later many supplies for gunboats for the contracting firm of McCord & Beck, and later still more goods were produced for Capt. John Eads, the engineer who designed the St. Louis Bridge over the Mississippi and the jetties at that river's delta where it enters the Gulf of Mexico.

Mr. Kupferle is an enthusiastic sportsman and takes his recreation in angling and duck hunting in the spring and fall months. He belongs to the old school of sturdy, practical mechanics, painstaking, conscientious and honorable, possessing a store of knowledge and reminiscence which is not displayed except modestly among friends or the younger men in his confidence.

Export Trade Topics.

PRACTICAL SUGGESTIONS ON EXPORT TRADE.

Eleventh Article.—GETTING FOREIGN BUSINESS.

TO cultivate possible foreign buyers for a line of goods involves, first, knowing who the buyers are in the different markets. Good results are often obtained from advertising for export business in desirable mediums. Other work must be done through circulars, catalogues and personal letters.

Where Shall They Be Addressed?

The manufacturer's export manager will be able to degrees to compile a very fair list for mailing purposes. In a general way or to make a start, he may rely on names selected from Kelly's (English), or from the Didot-Botin (French) directories of the world. The United States Consuls may be appealed to for the names of desirable customers in their respective territories and will usually reply, sometimes through the Department at Washington.

The Bureau of Manufactures, Department of Commerce and Labor, Washington, probably already has on file names of many foreign houses dealing in the sort of goods which it is desired to introduce. Bankers may be asked to write to their correspondents for names of good business houses, and sometimes the various foreign consuls in New York are able to suggest desirable names in their several countries.

In some parts of the world there exist large general importers who should not be neglected, no matter if not specifically included in special trade lists. Similarly there are almost everywhere hundreds of so-called commission agents from whom most of the new manufacturer's mail is quite sure to originate at first. These individuals are to be avoided as a rule. Most of them are absolutely irresponsible, some of them downright frauds and few of them desirable even as correspondents.

If a thoroughly good local commission agent can be discovered and proven an arrangement with him to supervise the development of the manufacturer's business in his town or territory, in return for a small commission, is sometimes desirable, and the Germans commonly pursue that system. However it is difficult to find the grain

of wheat characteristic of these individuals without a personal visit to the field, and a safer rule is to disregard commission agents abroad.

Catalogues for Foreign Circulation.

It is usually desirable to arrange special catalogues or at least abbreviated editions for foreign work. To obtain the best results they should be printed in languages understood in the territories to be cultivated. For universal work there should be editions in English, Spanish, French and German.

Prices ought to be indicated in sterling in all editions, or in francs or marks or in "gold" dollars in special editions, and all measurements, weights, &c., should be translated from English into equivalent values of the metric system in order to render them readily intelligible to the trade beyond borders where English influences prevail.

Foreign Credit Reports.

The credit standing of a foreign customer is not easily determined, nor will the beginner in export business be satisfied with the so-called reports that are supplied him. Both of our two largest commercial agencies make a practice now of obtaining foreign reports for their subscribers in return for extra fees, and in territories that they reach their reports are perhaps the best that can be had. There exist some commercial agencies in Europe and in other parts of the world, some reliable, some rather the contrary, but none of them comparable in any respect to our own.

Local banks in the city of the debtor may be appealed to, and if two such reports are obtained the consensus of opinion may be regarded as worthy of confidence. Otherwise bankers' opinions may be open to question, since one can never tell how far the bank itself may be interested. Foreign "references" to other foreign merchants equally as unknown are worthless. However, the foreign practice is to rely chiefly, almost exclusively, on bankers' "opinions," and foreign bankers have regular information departments and make a practice of giving "opinions" as to houses in their city. Appeals to them may be addressed either directly or preferably through the manufacturer's New York foreign banker's intermediary.

It was observed under the head of foreign drafts and acceptances that the latter are promptly honored rather more frequently abroad than in this country, and that the effect of a default in payment of an acceptance in the hands of a bank is far more serious abroad than in this country. The explanation lies in part in the fact that where no reliable commercial agencies exist it is the local bankers who give information about credit standing of merchants, and every protest that they register against a merchant injures the standing or their opinion of that merchant and will be embodied in the reports for which they are constantly being asked. The mere fact that a banker reports that a customer has invariably met his bills promptly on due date is a recommendation.

But no such detailed reports on a merchant's financial means and responsibility is available in any part of the world comparable with those to which we are accustomed in the United States. And yet commercial losses are no higher in percentage in most other countries than here.

Samples and Consignments.

Many foreign correspondents will insist upon the submission of samples before placing orders. It is sometimes rather hard for the manufacturer to draw the line in this regard. To acquiesce in every demand that is made upon him is a serious and an expensive undertaking. Yet it cannot be denied that with what foreigners are fond of calling "serious" houses samples are a great incentive to trade. The abuse of the sample habit may probably be guarded against by a competent export manager able to judge of the desirability of the trade offered.

Similarly a consignment of goods to a peculiarly desirable customer, to be paid for as and when sold, will often result in the establishment of a permanently profitable connection. But it should be understood at the outset that such consignment in itself is pretty certain

to result in a loss. In these respects, sampling, credits, collections, a foreign office is usually of immense benefit to the manufacturer. He should aim at the establishment of a foreign connection at the earliest moment justified by his developing business.

PRICE-LISTS, CIRCULARS, Etc.

Manufacturers in Hardware and related lines are requested to send us copies of catalogues, price-lists, etc., for our Catalogue Department in New York; and at the same time to call attention to any new goods or additions to their lines, of which appropriate mention will be made, besides the brief reference to the catalogue or price-list in this column.

CLARK BROS. BOLT COMPANY, Milldale, Conn.: Catalogue, conveniently indexed, relating to Carriage, Machine, Plow and Special Bolts, Coach Screws, Nuts, Washers, Rivets, &c. The book is substantially bound in cloth, and the indexed pages provide ready reference to the different lines.

THE SCRANTON WHETSTONE & ABRASIVE WHEEL COMPANY, Scranton, Pa.: Catalogue and price-list W devoted to Emery and Corundum Wheels, Oilstones and Razor Hones. In making the Wheels the best quality of crystal corundum or pure Turkish emery is used, as desired.

COOLEY MFG. COMPANY, 103-105 South Canal street, Chicago, Ill.: Illustrated circular showing the Cooley, Colt, Calif and Weaner.

THE STANLEY WORKS, New Britain, Conn.: Discount sheet No. 14, under date of May 20, giving discounts from list prices in the company's catalogue of February, 1906.

CUSPIDOR MFG. COMPANY, Newark, N. J.: Illustrated catalogue of Watson's Patent Cuspidors, having removable bowl or pan, made in porcelain and iron, japanned. Included in the same catalogue are Reflector Candlesticks, Cuspidor or Pitcher Mats, Match Stands, &c.

THE NEW YORK FLEXIBLE METALLIC HOSE & TUBING COMPANY, 173-177 Lafayette street, New York: Bulletin No. 25 relating to Nyflexmet Lead Covered Flexible Metallic Hose and Tubing.

THE BRUNHOFF MFG. COMPANY, Cincinnati, Ohio: Catalogue No. 17 of Cigar Cutters and Lighters and other similar lines heretofore manufactured by the Erie Specialty Company of Erie, Pa., the patent rights, patterns, tools and business pertaining thereto having been purchased by the Brunhoff Mfg. Company.

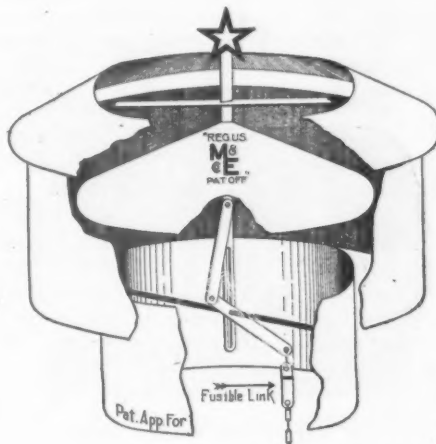
BUFFALO FORGE COMPANY, Buffalo, N. Y.: Illustrated pamphlet relating to leaders for 1907 in Blacksmiths' Tools, including Portable Forges, Geared Hand Blowers, Punches and Shears, Drills, &c. The No. 200 Hand Blower is built with four legs clamped by a brace near the bottom, together with a new style of head fastening the Blower to the stand, all constructed so that the Blower can be knocked down and compactly packed, it is stated, within three minutes and set up in the same space of time. The No. 660 Down Draft Forge is accompanied with a first joint of cast iron pipe, to lengthen the life of the forge.

SOMETHING over 12 months ago the Samuel Winslow Skate Mfg. Company, Worcester, Mass., established a New York office at 84-86 Chambers street. The demand for the company's product has been so large and the business carried on at this location has grown to such an extent that it has been found necessary to procure larger quarters. Since June 1 the company has occupied the entire fifth floor at the above address, Russell L. Penny being placed in charge as manager, succeeding John J. Young. In the enlarged quarters it is the intention of the company at all times to carry a complete stock of both Ice and Roller Skates and parts.

Stevenson & McLean have succeeded to the Hardware, Stove, Sporting Goods and Furniture business of Wachob & McLean, Tabor, Iowa.

Fire Retarding Star Ventilator.

The fire retarding ventilator, shown herewith, is offered by Merchant & Evans Company, Philadelphia, Pa. The roof of the device is movable vertically, and is held in its highest open position by a lever movement, controlled by a fusible link. In case of fire the link parts and the top drops down by gravity, closing the opening.

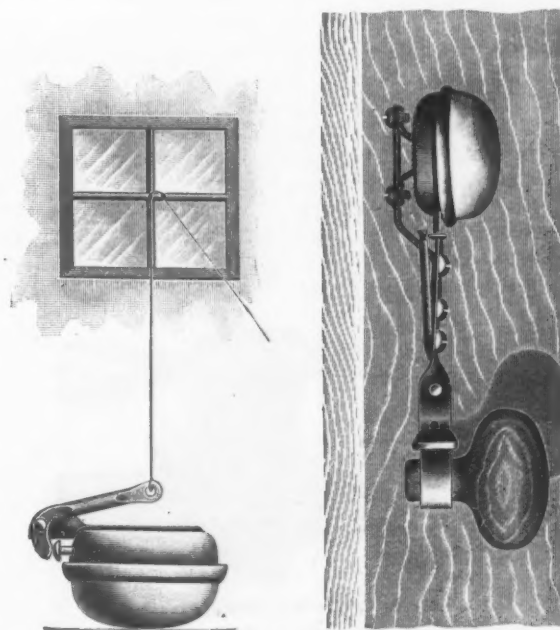


Fire Retarding Star Ventilator.

The top is also a damper itself, as by regulating the chain length the opening is partially or wholly closable at any time, and still retains its automatic closing feature in case of fire. The ventilator can be supplied with glass top if desired.

The Swan Window and Door Alarm.

The James Swan Mfg. Company, Seymour, Conn., is putting on the market a simple and inexpensive window and door alarm which may be attached to a door knob or to the window of a sleeping or other apartment. It consists of a bell attached to a metal arm having a metal slide upon its face, as shown in the illustration. A slight variation of the operating arm forces the slide downward and operates the spring and gear mechanism of the bell, which continues to ring until the spring runs down.

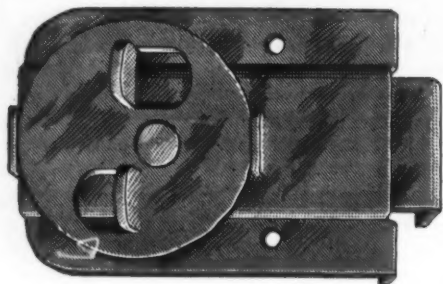


The Swan Window and Door Alarm.

When used upon a door it is fastened to the shank of the knob by means of a clamp. The turning of the knob in either direction oscillates the operating lever and springs the alarm. When attached to a window the raising of the sash operates the lever by means of a cord.

The Worthington Window Lock.

Worthington Roller Screen Company, Hagerstown, Md., is offering the window lock shown in the accompanying cut. It is made of pressed steel, nickel plated, and is $1\frac{1}{8} \times 2\frac{1}{4}$ in. in size. In use the sash is raised and the lock is slipped up from the bottom, between sash and jamb. Some of the advantages mentioned by the manufacturer are as follows: That the lock will not scratch or disfigure the side of a window frame, as the lock does not come in contact with the sides; that burglars do not know where to find the lock from the outside, as they would an ordinary sash fastener; that a window can be



The Worthington Window Lock.

locked at any height and will not rattle when the wind blows, and that it can be used on windows without weights with all the convenience of weights. The bolt of the lock is thrown out or in by turning the circular plate in either direction. The device is entirely devoid of springs.

The Taylor Quick Adjusting Self-Locking Steel Bar Clamps.

James L. Taylor Mfg. Company, Bloomfield, N. J., is putting on the market a supplementary line of quick ad-

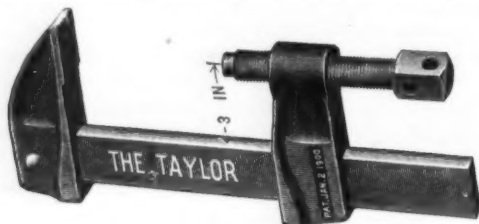


Fig. 1.—Steel Bar Clamp No. 40.

justing self-locking steel bar clamps, as shown in the accompanying illustrations. The clamps shown in Figs. 1 and 2 have sliding heads, which may be instantly adjusted against the work. The clamp shown in Fig. 3 has a stationary head. It is light and handy, but powerful for its weight, and suitable for a wide range of work. Clamp No. 40, Fig. 1, is unusually strong and designed for use in foundry, machine shop and structural work. The clamp illustrated in Fig. 2 is intended for use in the heaviest class of machine shop, bridge and boiler work. The

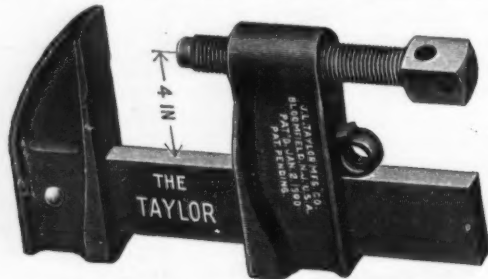


Fig. 2.—Steel Bar Clamp No. 45.

gripping action used on the clamps shown in Figs. 1 and 3 is illustrated in Fig. 4. The center of the three cuts gives a sectional view of the sliding head with bar, springs and gripping blocks in position. The other two cuts show the gripping block and spring, full size. The clamping action is positive, for the greater the strain the tighter it grips. The grip used on clamp Fig. 2 is shown in Fig. 5. This is self-locking, and a wedge is

employed to carry the gripping block. It is explained that the head will not slip under any strain that can be applied, even when brought to bear directly at the base of the head, close to and in a direct line with the bar. In shifting the head it is only necessary to grasp the pro-



Fig. 3.—Steel Bar Clamp No. 14.

jecting end of the wedge between the thumb and second finger, as shown in Fig. 5, the first finger pressing slightly against the head. This releases the wedge, and the head is moved back any distance desired. The head is moved forward by pushing it along the bar to any point, when it grips instantly wherever it is left. Among the advan-



Fig. 4.—Gripping Action, Style No. 1.

tages claimed for the clamps are the following: That the sliding head may be instantly adjusted against the work; that the self-locking action is combined with positive grip; that the power may be applied with ease, owing to a finer and more powerful screw; that the adjustable head renders unnecessary a long screw which might be

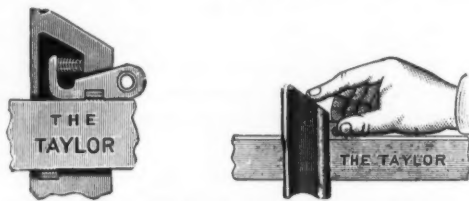
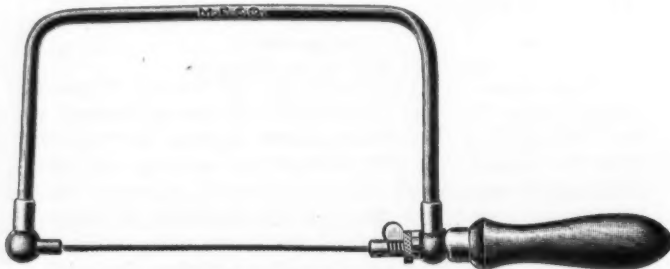


Fig. 5.—Gripping Action, Style No. 2.

sprung out of true or broken, and, that the high grade steel bar, used exclusively in all styles of this line, more than doubles the strength of the clamp. Both the material and workmanship in the clamps are alluded to as being of the highest order. The castings are of the best air furnace refined malleable iron and the steel used in the bars is rolled especially to order, and is exceptionally strong.

Ball Bearing Coping Saw No. 42.

The coping saw shown herewith is put on the market by the Millers Falls Company, 28 Warren street, New



Ball Bearing Coping Saw No. 42.

York. The frame has ball bearings under the head of the outer draw bolt, so that the frame revolves automatically without reference to the angle of the blade, and in accordance with the requirements of the work. When desired the frame can be made rigid. The automatic revolving of the frame is an advantage obviating, as it does, the necessity of stopping work to change the angle of the

blade in the frame when operating in various directions. In operation the blade is inserted and strained to the required tension by the aid of the handle. When the tension is correct the knurled nut is turned down, allowing the small end of the wing gib to enter one of the slots in the draw bolt. This prevents the handle turning backward, off the bolt, when using. Two of the slots in the draw bolt are deeper than the other two, and are for use in making the frame rigid by allowing the end of the gib to go down through them into the V slot in the clamp.

The Hoosier Jack and Combination Tool.

The Hoosier jack and combination tool, shown in the accompanying illustrations, is offered by the Enterprise Foundry & Fence Company, Indianapolis, Ind. The combination tool is made of high grade malleable and cast iron and each one is thoroughly tested before leaving the

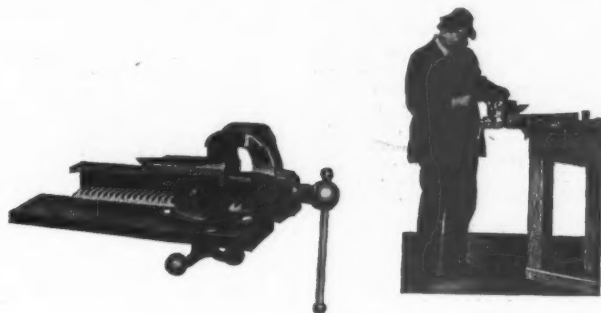


Fig. 1.—The Hoosier Handy Combination Vise.



Fig. 2.—Used as a Vise.

factory. The construction of the various parts of the tool is such that quick adjustment can be made when changing from one class of work to another. It can be readily adjusted and used as a drill press, a pipe vise or bolt grip by attaching serrated jaws, for stretching or splicing wire for pulling posts, in repairing shoes, and as a lifting jack. The vise rests on a swivel base with a clamp, so that it can be turned to any desired angle and securely fastened. The jaws, while moderate in weight, are strongly reinforced and so shaped that filing or any other work may be done at any angle, without any part

of the appliance interfering. The vise jaws are 4 in. wide, and the height above the bar is 3½ in. The rack bar is 18 in. long, permitting an opening of 9 in. between the jaws. The back jaw can be pulled forward to the de-



Fig. 3.—Vise Converted to Drill Press.

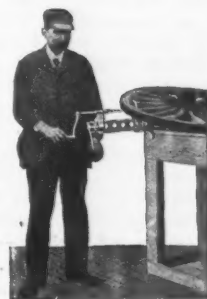


Fig. 4.—Used as a Drill Press.

sired distance, being held in position by an automatic pawl, which operates and is governed by gravity. The screw and handle fit into a slotted collar, which sits in the rack bar, making it instantaneously detachable. The screw is only 2 in. long, this being all that is required for



Fig. 5.—Splicing Fence with Combination Vise.

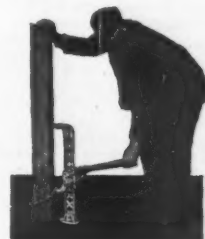


Fig. 6.—Pulling Posts with Combination Vise.

quick return and action of the jaw. It is pointed out that the automatic adjustment of the back jaw, together with the short screw, saves time in adjusting, obviating the continuous turning of the handle until the desired opening between the jaws is secured. With the device a few turns is sufficient to tighten so that it will hold the smallest piece as well as larger ones.

PAINTS, OILS AND COLORS

Animal, Fish and Vegetable Oils—

	per gal.
Linseed, City, raw.....	45 @ 46
City, Boiled.....	46 @ 47
State and Western, raw.....	44 @ 45
Raw Calcutta, in bbls.....	70 @
Lard, Extra Prime, Winter.....	77 @ 78
Extra No. 1.....	57 @ 58
No. 1.....	49 @ 50
Cotton-seed, Crude, f.o.b. mills.....	31 @ 32
Summer Yellow, Prime.....	57 @ 58
Summer White.....	62 @ 63
Yellow Winter.....	61 @ 62
Sperm, Crude.....	59 @ 60
Natural Winter.....	72 @ 73
Bleached Winter.....	75 @ 76
Bleached Winter, Extra.....	76 @ 77
Tallow, Prime.....	60 @ 61
Whale, Crude.....	35 @ 36
Natural Winter.....	46 @ 47
Bleached Winter.....	48 @ 49
Extra Bleached Winter.....	51 @ 52
Menhaden, Brown, Strained.....	32 @ 33
Light Strained.....	32 @ 33
Northern.....	26 @ 27
Southern.....	26 @ 27
Cocconut, Ceylon.....	9 @ 9 1/4
Cochin.....	10 1/4 @ 10 1/2
Cod, Domestic, Prime.....	36 @ 37
Newfoundland.....	43 @ 44
Red, Elaine.....	43 @ 44
Saponified.....	7 @ 7 1/4
Olive, Italian, bbls., Yellow.....	85 @ 86
Neatsfoot, Prime.....	56 @ 57
Palm, Logos.....	7 @ 7 1/4

Mineral Oils—

Black, 29 gravity, 25@30 cold test.....	12 1/2 @ 13
29 gravity, 15 cold test.....	13 @ 13 1/4
Summer.....	12 @ 12 1/4
Cylinder, light filtered.....	19 @ 20
Dark, filtered.....	16 1/2 @ 17 1/4
Paraffine, 903-907 gravity.....	14 @ 14 1/4
903 gravity.....	13 @ 13 1/4
904 gravity.....	14 1/4 @ 14 1/2
Red.....	13 @ 14 1/4

Miscellaneous—

Barytes:	
White, Foreign.....	18.50 @ 20.50
Amer. floated.....	19.00 @ 20.00
Off color.....	13.00 @ 16.50
Chalk, in bulk.....	3.00 @ 3.25
In bbls.....	3.00 @ 3.25
China Clay, Imported.....	11.00 @ 17.50
Cobalt, Oxide.....	2.50 @ 2.60
Whiting, Commercial.....	43 @ 52
Gilders.....	55 @ 65
Ex. Gilders.....	60 @ 65
Putty, Commercial.....	100 lb
In bladders.....	\$1.70 @ 1.85
In bbls. or tubs.....	1.20 @ 1.45
In 1 lb to 5 lb cans.....	2.65 @ 2.95
In 1 1/2 to 50 lb cans.....	1.50 @ 1.90
Spirits Turpentine.....	per gal.
In Oil bbls.....	60 1/2 @ 61
In machine bbls.....	61 @ 61 1/2
Glue—	
Cabinet.....	12 @ 15
Common Bone.....	7 1/2 @ 9
Extra White.....	18 @ 24
Foot Stock, White.....	12 @ 14
Foot Stock, Brown.....	9 @ 11
German Hide.....	12 @ 18
French.....	10 @ 40
Irish.....	13 @ 16
Low Grade.....	10 @ 12
Medium White.....	14 @ 17
Gum Shellac—	
Bleached, Commercial.....	44 @ 45
Bone, Dry.....	57 @ 58
Button.....	40 @ 50
Diamond I.....	59 @ 60
Fine Orange.....	52 @ 57
A. C. Garnet.....	45 @ 46
Kala Button.....	62 @ 63
D. C. Button.....	56 @ 57
Octagon B.....	45 @ 48
T. N.....	45 @ 48
V. S. O.....	50 @ 60
Colors in Oil—	
Black, Lampblack.....	12 @ 14
Black, Chinese.....	36 @ 46
Blue, Prussian.....	32 @ 36

Blue, Ultramarine.....	13 @ 16
Brown, Vandyke.....	11 @ 14
Green, Chrome.....	12 @ 16
Green, Paris.....	24 @ 24
Sienna, Raw.....	12 @ 15
Sienna, Burnt.....	12 @ 15
Umber, Raw.....	11 @ 14
Umber, Burnt.....	11 @ 14

White Lead, Zinc, &c.—

Lead, English white, in Oil.....	10 1/2 @ 10 3/4
Lead, American White:	
Lots of 500 lb or over, in Oil.....	7 1/4 @ 7 1/2
Lots less than 500 lb, in Oil.....	8 @ 8
Lead, White, in oil, 25 lb tin	
pails, add to keg price.....	1/4 @ 1/4
Lead, White, in oil, 12 1/2 lb tin	
pails, add to keg price.....	1 @ 1
Lead, White, in oil, 1 to 5 lb	
ass'ted tins, add to keg price.....	1 1/2 @ 1 1/2
Lead, American, Terms: For lots 12	
tons and over 1/4% rebate; and 2% for	
cash if paid in 15 days from date of	
invoice; for lots of 500 lbs. and over	
2% for cash if paid in 15 days from	
date of invoice, for lots of less than	
500 lbs. net.....	7 @ 7
Zinc, American, dry.....	5 1/2 @ 5 1/4
Zinc, French:	
Antwerp, Red Seal, dry.....	8 1/2 @ 8 1/2
Antwerp, Green Seal, dry.....	10 1/4 @ 10 1/4
Paris, Red Seal, dry.....	9 1/4 @ 9 1/4
Paris, Green Seal, dry.....	11 @ 11
Zinc, V. M. French, in Poppy Oil:	
Green Seal:	
Lots of 1 ton and over.....	13 1/4 @ 13 1/4
Lots of less than 1 ton.....	13 1/4 @ 13 1/4
Zinc, V. M. French, in Poppy Oil:	
Red Seal:	
Lots of 1 ton and over.....	11 1/4 @ 12 1/4
Lots of less than 1 ton.....	12 1/4 @ 12 1/4
Discounts.—French Zinc.—Discounts	
to buyers of 10 bbl. lots of one or mixed	
grades. 1%; 25 bbls. 2%; 50 bbls. 4%.	
Dry Colors—	
Black, Carbon.....	6 1/4 @ 10
Black, Drop, American.....	3 1/4 @ 5
Black, Drop, English.....	5 @ 15

Black, Ivory.....	16 @ 20
Lamp, Com.....	4 @ 6
Blue, Celestial.....	4 @ 6
Blue, Chinese.....	30 @ 33
Blue, Prussian.....	28 @ 32
Blue, Ultramarine.....	3 1/4 @ 15
Brown, Spanish.....	1 1/2 @ 1
Carmine, No. 40.....	\$3.10 @ 3.25
Green, Chrome, ordinary.....	3 1/2 @ 7
Green, Chrome, pure.....	17 @ 25
Lead, Red, bbls., 1/2 bbls., kegs.....	17 @ 7 1/4
Litharge, bbls., 1/2 bbls., kegs.....	17 @ 7 1/4
Ocher, American.....	10 @ 12
American Golden.....	14 @ 16
French.....	14 @ 16
Foreign Golden.....	3 @ 4
Orange Mineral, English.....	10 @ 12
French.....	11 1/2 @ 12
German.....	10 @ 12
American.....	8 1/2 @ 9
Red, Indian, English.....	4 1/2 @ 6
American.....	3 @ 3 1/4
Red, Turkey, English.....	4 @ 10
Red, Tuscan, English.....	7 @ 10
Red, Venetian, Amer.....	100 lb \$0.50 @ 1.25
English.....	100 lb \$1.15 @ 1.60
Sienna, Italian, Burnt and	
Powdered.....	3 @ 9
Italian, Raw, Powdered.....	3 @ 7
American, Raw.....	14 @ 16
American Burnt and Pow'd.....	14 @ 16
Talc, French.....	100 lb \$18.00 @ 25.00
American.....	100 lb \$15.00 @ 25.00
Terra Alba, French.....	100 lb \$9.00 @ 1.00
English.....	100 lb \$8.00 @ 1.00
American.....	100 lb \$7.50 @ 1.00
American.....	100 lb \$6.00 @ 1.00
Umber, T'kev. Bnt. & Pow'd.....	2 @ 3 1/4
Turkey, Raw and Powdered.....	7 1/4 @ 3 1/2
Burnt, American.....	14 @ 16
Raw, American.....	14 @ 16
Yellow Chrome, Pure.....	12 @ 12
Vermilion, American Lead.....	7 @ 15
Quicksilver, bulk.....	6 @ 6
Quicksilver, base.....	6 @ 6
English, Imported.....	6 @ 6
Chinese.....	\$0.90 @ 1.25

Current Hardware Prices.

General Goods.—In the following quotations General Goods—that is, those which are made by more than one manufacturer—are printed in *Italics*, and the prices named, unless otherwise stated, represent those current in the market as obtainable by the fair retail Hardware trade, whether from manufacturers or jobbers. Very small orders and broken packages often command higher prices, while lower prices are frequently given to larger buyers.

Special Goods.—Quotations printed in the ordinary type (Roman) relate to goods of particular manufacturers, who are responsible for their correctness. They usually represent the prices to the small trade, lower prices being obtainable by the fair retail trade, from manufacturers or jobbers.

Range of Prices.—A range of prices is indicated by means of the symbol @. Thus 33% @ 33% & 10% signifies

that the price of the goods in question ranges from 33% per cent. discount to 33% and 10 per cent. discount.

Names of Manufacturers.—For the names and addresses of manufacturers see the advertising columns and also THE IRON AGE DIRECTORY, issued May, 1906, which gives a classified list of the products of our advertisers and thus serves as a DIRECTORY of the Iron, Hardware and Machinery trades.

Standard Lists.—A new edition of "Standard Hardware Lists" has been issued and contains the list prices of many leading goods.

Additions and Corrections.—The trade are requested to suggest any improvements with a view to rendering these quotations as correct and as useful as possible to Retail Hardware Merchants.

Adjusters, Blind—

Columbian and Domestic.....33%
North.....10%
Zimmerman—See Fasteners, Blind.

Window Stop—

Ives' Patent.....35%
Taplin's Perfection.....35%

Ammunition—See Caps, Cartridges, Shells, &c.

Anti-Rattlers—

Fernald Mfg. Co. Burton Anti-Rattlers, 1/2 doz. pairs, Nos. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000

Anvils—American—

Eagle Anvils.....1/2 lb. @ 8%
Hay-Budden, Wrought.....1/2 lb. @ 9%
Trenton.....1/2 lb. @ 9%

Imported—

Peter Wright & Sons, 1/2 lb. 84 to 349
lb. 11¢; 350 to 600 lb. 11¢.

Anvil, Vise and Drill—

Millers Falls Co., 1/2 lb. 10¢.....15%
10¢.....15%

Apple Parers—See Parers, Apple, &c.

Aprons, Blacksmiths—

Livingston Nail Co.....33%

Augers and Bits—

Com. Double Spur.....70¢ @ 70¢ & 10%
Jennings' Patn., reg. finish.....60¢ @ 60¢ & 10%

Black Lip or Blued.....65¢ @ 65¢ & 10%
Boring Mach. Augers.....70¢
Car Bits, 12-in. twist.....40¢ @ 40¢ & 10%
Ford's Auger and Car Bits.....40¢ & 10%
Ft. Washington Auger Co., Concord's Auger Bits.....35%
Forsner Pat. Auger Bits.....25%
C. E. Jennings & Co., No. 19 ext. lip, R. Jennings' list.....25% & 10%

No. 30, R. Jennings' list.....50%
Russell Jennings.....25% & 10%
L'Hommedieu Car Bits.....15%
Mayhew's Countersink Bits.....15%
Pugh's Jennings' Pattern.....30%
Snell's Auger Bits.....60%
Snell's Bell Hangers' Bits.....60%
Snell's Car Bits, 12-in. twist.....60%
Snell's King Auger Bits.....50%
Wright's Jennings' Bits.....50%

Bit Stock Drills—

See Drills, Twist.

Expansive Bits—

Clark's small, 1/8; large, 3/16.....60¢ @ 60¢ & 10%
Clark's pattern, No. 1, 1/2 doz. 25¢
No. 2, 1/8.....60¢ @ 60¢ & 10%
Ford's, Clark's Pattern.....60¢ & 10%
C. E. Jennings & Co., Steer's Pat. 25%
Lavigne Pat., small size, 1/8, 10¢; large size, 3/16, 10¢.....60¢ @ 60¢ & 10%
Swan's.....60%

Gimlet Bits—

Common Dble. Cut.....\$3.00 @ 3.25
German Pattern, Nos. 1 to 10, 24.75; 11 to 13, 25.75

Hollow Augers—

Bonney Pat., per doz. \$6.50 @ 7.00
Ames.....25% & 10%
Universal.....25%
Wood's Universal.....25%

Ship Augers and Bits—

Ship Augers.....40¢ @ 40¢ & 10%
Ford's.....35% & 10%
C. E. Jennings & Co.:
L'Hommedieu's.....6%
Watrous'.....33% & 10%
Snell's.....40%

Awl Hafts—See Handles, Mechanics' Tool.

Awls—

Brad Awns:
Handled.....gro. \$2.75 @ 3.00
Unhanded, Shlivered.....gro. 63¢ @ 66¢
Unhanded, Patent.....gro. 66¢ @ 70¢

Peg Awns—

Unhanded, Patent.....gro. 31¢ @ 34¢
Unhanded, Shlivered.....gro. 63¢ @ 66¢

Scratch Awns—

Handled, Com.....gro. \$3.50 @ 4.00
Handled, Socket.....gro. \$11.50 @ 12.00

Awl and Tool Sets—See Sets, Awl and Tool.

Axes—

Single Bit, base weights: Per doz.
First Quality.....\$4.75 @ 5.00
Second Quality.....\$4.25 @ 4.50

Double Bit, base weights:
First Quality.....\$7.00 @ 7.50
Second Quality.....\$6.50 @ 6.75

Axle Grease—

See Grease, Axle

Axles—

Iron or Steel

Concord, Loose Collar.....4 1/2 @ 5¢
Concord, Solid Collar.....4 1/2 @ 5 1/2¢
No. 1 Common, Loose.....3 1/2 @ 4¢
No. 1 1/4 Com., New Styles.....4 1/4¢
No. 2 Solid Collar.....3 1/2 @ 4 1/4¢

Half Patent:
Nos. 7, 8, 11 and 12.....70¢ @ 75¢
Nos. 13 to 14.....70¢ @ 75¢
Nos. 15 to 18.....75¢ @ 75¢
Nos. 19 to 22.....75¢ @ 75¢

Boxes, Axle—

Common and Concord, not turned
lb. 4 1/2 @ 5¢

Common and Concord, turned
lb. 5 1/2 @ 6¢

Half Patent.....lb. 9 1/2 @ 10¢

Bait—

Fishing—

Hendryx:
A Bait.....20%
B Bait.....25%
Competitor Bait.....20% & 5%

Balances—

Sash—

Caldwell new list.....50%
Fulman.....50¢ @ 50¢ & 10%

Spring—

Spring Balances.....50¢ @ 50¢ & 10%
Chattillon's:
Light Spg. Balances.....50¢ @ 50¢ & 10%
Straight Balances.....40¢ @ 40¢ & 10%
Circular Balances.....50¢ @ 50¢ & 10%
Large Dial.....50%

Barb Wire—See Wire, Barb.

Bars—

Crow—

Steel Crowbars, 10 to 40 lb. per lb. 2 1/4 @ 3¢

Towel—

No. 10 Ideal, Nickel Plate.....\$4.50

Beams, Scale—

Scale Beams.....40%
Chattillon's No. 1.....30%
Chattillon's No. 2.....40%
Chattillon's No. 3.....40%

Beaters, Carpet—

Holt-Lyon Co.:
No. 12 Wire Coppered 1/2 doz. \$0.80;
Tinned.....\$0.85
No. 11 Wire Coppered 1/2 doz. \$1.15;
Tinned.....\$1.20
No. 10 Wire Tinned.....\$1.50
Western W. G. Co.:
No. 1 Electric.....\$0.75 gro. \$1.50
No. 2 Buffalo.....\$0.75 gro. \$1.50
No. 3 Perfection Dust.....\$0.75 gro. \$1.50

Egg—

Holt-Lyon Co.:
Holt, per doz. No. 5, Jap'd, \$0.80;
No. A, Jap'd, \$1.15; No. B, Jap'd, \$1.85; No. 6, Jap'd, \$1.65.
Lyon, Jap'd, per doz. No. 2, \$1.35.

Taplin Mfg. Co.:
Improved Dover, per gro. No. 60, \$6.00; No. 75, \$6.50; No. 100, \$7.00;
No. 102, Tin'd, \$8.50; No. 150, Hotel, \$15.00; No. 152, Hotel Tin'd, \$17.00; No. 200, Tumbler, \$2.50; No. 202, Tumbler Tin'd, \$3.50; No. 300, Mammoth, per doz. \$25.00.

Tanner & Seymour Mfg. Co.:
T. & S. Dover.....\$6.00
Western W. G. Co., 1/2 gro. Buffalo, No. 2, \$8.00; Perfection, No. 3, \$9.00.

Wunder (R. M. Co.), 1/2 gro. net, \$8.25

Bellows—

Blacksmith, Standard List.

Split Leather.....60¢ @ 60¢ & 10%
Grain Leather.....50¢ @ 50¢ & 10%

Hand—

Inch.....6 7 8 9 10
Doz. \$5.00 5.50 6.00 6.50 7.50

Molders—

Inch.....10 12 14 16
Doz. \$7.50 9.00 12.00 15.00

Bells—

Cow—

Ordinary Goods.....75¢ @ 75¢ & 10%
High grade.....70¢ @ 70¢ & 10%
Jersey.....75¢ @ 75¢ & 10%
Texas Star.....50%

Door—

Barton Gong.....50%
Home, R. & E. Mfg. Co.'s.....35% @ 10%

Hand—

Polished, Brass.....50¢ @ 50¢ & 10%
White Metal.....50¢ @ 50¢ & 10%
Nickel Plated.....40¢ @ 40¢ & 10%
Swiss.....50¢ @ 50¢ & 10%
Cone's Globe Hand Bells.....3 1/2 @ 35%

Miscellaneous—

Farm Bells.....lb. 2 1/4 @ 2 1/2¢
Church and School.....60¢ @ 60¢ & 10%

Belting—

Leather—

Extra Heavy, Short Lap.....60¢ @ 60¢ & 10%
Regular Short Lap.....60¢ @ 60¢ & 10%
Standard.....70¢ @ 70¢ & 10%
Light Standard.....75¢
Cut Leather Lacing.....40¢ @ 40¢ & 10%
Leather Lacing Slides, per sq. ft. 25¢

Rubber—

Agricultural (Low Grade).....75¢ @ 75¢ & 10%
Common Standard.....70¢ @ 70¢ & 10%
Standard.....70¢ @ 70¢ & 10%
Extra.....60¢ @ 60¢ & 10%
High Grade.....50¢ @ 50¢ & 10%

Bench Stops—

See Stops, Bench

Hendryx Bronze; Series 700, 800, 30%
Hendryx Enamelled.....35%

Calipers—See Compasses.**Calks, Toe and Heel—**

Blunt, 1 prong, per lb., 4 1/4 @ 4 1/4¢
Sharp, 1 prong, per lb., 4 1/4 @ 5 1/4¢
Burke's Blunt, 1 1/4 @ 4 1/4¢; Sharp, 4 1/4 @ 5 1/4¢
Bantier, Blunt, 1 1/4 @ 4 1/4¢; Sharp, 4 1/4 @ 5 1/4¢
Perkins, Blunt, 1 1/4 @ 3 1/2¢; Sharp, 4 1/4 @ 5 1/4¢

Can Openers—

See Openers, Can.

Cans, Milk—

Illinois Pattern.....1.35 1.85 2.95 each.
New York Pattern.....1.50 2.20 2.45 each.
Baltimore Pattern.....1.50 2.20 2.45 each.
Dubuque.....1.35 1.60 1.75 each.

Cans, Oil—

Buffalo Family Oil Cans:
3 10 gal. \$18.00 40.00 120.00 gro., net.

Caps, Percussion—

Eley's E. B.....50¢ @ 55¢
G. D.....per M 34¢ @ 35¢
F. L.....per M 40¢ @ 42¢
G. E.....per M 48¢ @ 50¢
Musket.....per M 62¢ @ 65¢

Primers—

Berdan Primers, 2¢ per M.....20¢ @ 5¢
Primer Shells and Bullets.....15¢ @ 10¢
All other primers per M.....\$1.52 @ 1.60

Carpet Stretchers—

See Stretchers, Carpet.

Cartridges—

Blank Cartridges:
32 C. F., \$5.50.....10¢ @ 5¢
38 C. F., \$7.00.....10¢ @ 5¢
22 cal. Rim, \$1.50.....10¢ @ 5¢
32 cal. Rim, \$2.75.....10¢ @ 5¢
B. B. Caps, Con. Ball, Siegel.....\$1.50
B. B. Caps, Round Ball.....\$1.40
Central Fire.....25¢
Target and Sporting Rifle.....15¢ @ 10¢
Primer Shells and Bullets.....15¢ @ 10¢
Rim Fire, Sporting.....50¢
Rim Fire, Military.....15¢ @ 5¢

Casters—

Bed.....65¢ @ 10¢
Plate.....60¢ @ 5¢
Philadelphia.....70¢ @ 10¢
Acme Ball Bearing.....33¢
Boss.....70¢ @ 10¢
Boss Anti-Friction.....70¢ @ 10¢
Gem (Roller Bearing).....80¢
Martin's Patent (Phoenix).....45¢
Standard Ball Bearing.....45¢
Tucker's Patent low list.....50¢
Yale (Double Wheel) low list.....50¢

Cattle Leaders—

See Leaders, Cattle.

Chain, Proof Coil—

American Coil, Straight Link:
5-16 1/4 5-16 3/4 7-16 1/2 9-16
\$8.77 6.17 5.02 4.57 4.37 4.27 4.22
3/8 1/2 3/4 1 1/4 to 1 1/2 inch.
\$4.77 4.07 4.02 4.12
In cash lots, deduct 25¢.

German Coil.....60¢ @ 10¢ @ 70¢

Halter—

Halter Chains.....60¢ @ 60¢ @ 65¢
German Pattern Halter Chains,
list July 24, '97.....60¢ @ 10¢ @ 65¢
Covert Mfg. Co.,
Halter.....35¢ @ 5¢

Cow Ties—

See Halters and Ties.

Trace, Wagon, &c.—

Traces, Western Standard: 100 pr.
6 1/4-6-3, Straight, with ring, \$28.00
6 1/4-6-2, Straight, with ring, \$29.00
6 1/4-8-2, Straight, with ring, \$32.00
6 1/4-10-2, Straight, with ring, \$37.00
NOTE—Add 2¢ per pair for Hooks.
Twist Traces: add per pair for Nos. 2
and 3, 2¢; No. 1, 3¢; No. 0, 4¢ to price of
Straight Link.

Eastern Standard Traces, Wag-
on Chain, &c.....60%

Miscellaneous—

Jack Chain, list July 10, '93:
Iron.....60¢ @ 10¢
Brass.....50¢ @ 10¢
Safety and Plumbers' Chain,
60¢ @ 10¢
Gal. Pump Chain.....lb. 40¢ @ 1/2¢
Covert Mfg. Co.:
Breast, Halter, Heel, Rein, Stal-
lion.....40%
Oneida Community:
American Halter, Dog and Kennel
Chains.....35¢ @ 2¢ @ 40¢
Niagara Dog Leads and Kennel
Chains.....45¢ @ 50¢ @ 55¢
Wire Goods Co.:
Dog Chain.....70¢ @ 10¢
Universal Dbl.-Jointed Chain.....50¢

Chain and Ribbon, Sash—

Oneida Community:
Steel Chain.....60%
Pullman:
Bronze Chain, 60%; Steel Chain,
60¢ @ 10¢
Sash Chain Attachments, per set, 3¢
Aluminum Sash Ribbon, per 100
ft.....\$1.25 @ \$3.00
Sash Ribbon Attachments, per set, 3¢

Chalk—(From Jobbers.)

Carpenters' Blue.....gro., 50¢ @ 55¢
Carpenters' Red.....gro., 45¢ @ 50¢
Carpenters' White.....gro., 40¢ @ 45¢

Checks, Door—

Bardley's.....45%
Pullman, per gro.....\$54.00
Russwin.....33% @ 5%

Chests, Tool—

American Tool Chest Co.:
Boys' Chests, with Tools.....50%
Youths' Chests, with Tools.....35%
Gentlemen's Chests, with Tools.....25%
Farmers' Chests, etc., Chests,
with Tools.....25%
Machinists' and Pipe Fitter's
Chests, Empty.....45%
Tool Cabinets.....45%
C. E. Jennings & Co.'s Machinists'
Tool Chests.....7 1/2%

Chisels—

Socket Framing and Firmer
Standard List.....70¢ @ 10¢ @ 75¢
Buck Bros.....30%
C. E. Jennings & Co.:
Socket Firmer No. 10.....25¢ @ 7 1/2¢
Socket Framing No. 15.....25¢ @ 7 1/2¢
Swan's.....66¢ @ 70¢
L. & I. J. White Co.....30¢ @ 30¢ @ 5%

Tanged—

Tanged Firmers.....30¢ @ 35¢
Buck Bros.....30%
C. E. Jennings & Co. Nos. 191, 181, 25¢
L. & I. J. White Co.....25¢ @ 5%

Cold—

Cold Chisels, good quality, 13¢ @ 15¢
Cold Chisels, fair quality, 11¢ @ 12¢
Cold Chisels, ordinary.....9¢ @ 10¢

Chucks—

Almond Drill Chucks.....35%
Almond Turret Six-Tool Chuck.....40%
Beach Pat., each \$8.00.....35¢ @ 5¢
Empire.....25%
Blacksmiths.....25%
Jacobs' Drill Chucks.....25%
Pratt's Positive Drive.....25%
Skinner Patent Chucks:
Independent Lathe Chucks.....40%
Universal, Reversible Jaws.....40%
Combination, Reversible Jaws.....40%
Drill Chucks, New Model, 25%:
Standard, 40¢ @ 10¢; Skinner Pat.,
25%; Positive Drive.....10¢
Planer Chucks.....20%
Face Plate Jaws.....40%
Standard Tool Co.:
Improved Drill Chuck.....45%
Union Mfg. Co.:
Combination, Nos. 1, 2, 3, 4, 5, 6,
7, 8 and 17, 40%; No. 21.....35%
Scroll Combination, Nos. 82 and
84.....30%
Geared Scroll, Nos. 33, 34 and 35, 30%
Independent Iron, Nos. 18 and 318, 35%
Independent Steel, No. 61.....25%
Union Drill, Nos. 000, 00, 100, 101,
102, 103, 104.....35%
Union Czar Drill.....25%
Universal 11, 12, 16, 17, 13, 14, 15, 35%
Universal, No. 42.....30%
Iron Face Plate Jaws, Nos. 28, 30,
42 and 50.....35%
Steel Face Plate Jaws, Nos. 70 and
72.....30%
Westcott Patent Chucks:
Lathe Chucks.....50%
Little Giant Auxiliary Drill.....50%
Little Giant Double Grip Drill.....50%
Little Giant Drill, Improved.....50%
Onida Drill.....50%
Scroll Combination Lathe.....50%

Clamps—

Adjustable, Hammers.....20¢ @ 20¢ @ 5¢
Carriage Makers, P., 8 & W.
Co.....50¢ @ 10¢
Resly, Parallel.....33¢ @ 10¢
Myers' Hay Rack.....45%
Lineman's, Utica Drop Forge & Tool
Co.....40%
Wood Workers, Hammers.....40¢ @ 10¢
Saw Clamps, see Vises, Saw Filers.

Cleaners, Drain—

Iwan's Champion, Adjustable.....50%
Iwan's Champion, Stationary.....40%

Sidewalk—

Star Socket, All Steel.....\$1.05 net
Star Shank, All Steel.....\$3.24 net
W. & C. Shank, All Steel, \$1 doz.
7 1/2 in., \$3.00; 8 in., \$3.25.

Cleavers, Butchers—

Poster Bros.....30%
Fayette R. Plumb.....30%
L. & I. J. White Co.....30%

Clippers, Horse and**Sheep—**

Chicago Flexible Shaft Company:
1902 Chicago Horse, each, \$10.75
20th Century Horse, each, \$5.00
Lightning Belt Horse, each, \$15.00
Chicago Belt Horse, each, \$20.00
Stewart's Enclosed Gear
Horse, each.....\$9.75
Stewart's Patent Sheep Shear-
ing Machine, each.....\$12.75
Stewart Enclosed Gear Shear-
ing Machine, No. 8, each.....\$9.75

Clips, Axle—

Regular Styles, list July 1, '05,
80¢ @ 80¢ @ 10%

Cloth and Netting, Wire**—See Wire, &c.****Cocks, Brass—**

Hardware Hat:
Plain Bibbs, Globe, Kerosene,
Racking, Liquor, Bottling,
&c.....60¢ @ 10¢ @ 65¢
Compression Bibbs.....55¢ @ 10¢ @ 60%

Coffee Mills—

See Mills, Coffee.

Collars, Dog—

Nickel Chain, Walter B. Stevens &
Son's list.....40%
Leather, Walter B. Stevens & Son's
list.....40%

Combs, Curry—

Metal Stamping Co.....40%

Compasses, Dividers, &c.

Ordinary Goods.....70¢ @ 10¢ @ 75¢
Wm. Schellhorn Co.:
Excelsior Dividers.....75%
Lodi Dividers.....75%

Conductor Pipe—

L. C. L. to Dealers:

Galv. Charcoal Copper.
Steel. Iron. 1 1/2, 1 3/4, 2 oz.

Eastern: 70% 50¢ @ 17 1/2% 30%

Central: 65¢ @ 10% 55¢ @ 2 1/4% 20¢ @ 10%

Western and Southern: 65¢ @ 5% 50¢ @ 7 1/2% 20¢ @ 7 1/2%

So. Western: 50¢ @ 25¢ @ 2 1/2% 50% 20¢ @ 5%

Terms, 60 days; 2% cash 10 days. Fac-
tory shipments generally delivered.

See also Eave Troughs.

Coolers, Water—

Gal. each.....2 3 4 6 8
Labrador.....\$1.20 \$1.50 \$1.80 \$2.10 \$2.70
Gal.....3 4 6 8
Iceland.....\$1.80 \$2.10 \$2.40 \$3.00
Gal.....2 3 4 6 8
Galvanized, ea. \$1.35 \$2.00 \$2.25 \$2.90 \$3.90
Galvanized, Lined, side handles,
Gal.....2 3 4 6 8
Each.....\$1.95 \$2.15 \$2.40 \$3.30 \$4.15
White Enamelled, 10%; Agate Lined, 10%

Coopers' Tools—

See Tools, Coopers'.

Coppers' Soldering—

Soldering Coppers, 3 lbs. to pair
and heavier, 32¢ @ 35¢; lighter
than 3 lb. to pair.....34¢ @ 37¢

Cord—

Sash.....lb. 35¢

Braided, White, Com., Nos. 8
to 12, 26¢; No. 7, 26¢ @ 4¢; No. 6,
27¢ @ 4¢.

Cable Laid Italian, lb., No. 18.....37¢

Italian, lb., A. No. 18, 25¢; B, 22¢

Common India.....lb., 11¢ @ 11 1/2¢

Cotton Sash Cord, Twisted, 18¢ @ 20¢

Patent Russia.....lb., 20¢

Cable Laid Russia.....lb., 21¢

India Hemp, Br'd'd.....lb., 21¢

India Hemp, Twisted.....lb., 13¢ @ 14¢

Patent India, Twisted.....lb., 17¢

Pearl Braided, cotton, No. 6, 3¢ lb.

27¢ @ 4¢; No. 7, 26¢ @ 4¢; Nos. 8 to 12, 26¢

Edystone, Braided, Nos. 8 to 12,
26¢; 7, 26¢ @ 4¢; 6, 27¢ @ 4¢.

Harmony Cable Laid Italian, Nos. 7
to 12.....lb. 23¢

Wire Sash Cord.....10%

Sash Cord Attachments, per doz. 10¢

Samson, Nos. 8 to 12:

Braided, 3/8 lb., Drab Cotton,
55¢; Linen Hemp, 40¢ @

50¢; Linen, 65¢; White Cot-
ton, 50¢; Spot Cord.....50¢

Massachusetts, White.....lb. 40¢

Massachusetts, Drab.....lb. 45¢

Phoenix, White, Nos. 8 to 12, 27¢;

Silver Lake, per lb.:
A, Drab, 45¢; A, White, 40¢;

B, Drab, 40¢; B, White, 35¢;

Italian Hemp, 40¢; Linen.....37¢ @ 4¢

See also Chain and Ribbon.

Wire, Picture—

List July 10, 1906, 85¢ @ 10¢ @ 85¢ @ 10¢ @ 10%

Hendryx standard Wire Picture Cord,
old list, 85¢ @ 10%

Turner & Stanton Co. Wire Picture
Cord.....85¢ @ 10¢ @ 10%

Cradles—

Grain.....40¢ @ 12 1/2%

Crayons—

White Round Crayons, Cases, 100
gro., \$6.50 @ \$7.50 at factory, but
lower prices made by jobbers
Zelnicke's Lumber.....gro.
White and Purple, Indelible.....\$7.50
Blue, Red, Green, Yellow and
Terra Cotta, \$6.50; Black.....\$1.00
Giant Lumber, 5 1/4 in. x 15-16 in.
round, all colors, \$16.25; Indel-
ible.....\$18.75
Genuine Soapstone, Metal Workers',
5 in. x 3/4 in. Round, \$2.50; 5 in. x
3/4 in. Square, \$1.75; 5 x 1 1/2 x 3-16,
\$2.50; 5 x 1 1/4 x 3-16.....\$3.00

Crooks, Shepherds—

Fort Madison, per doz., Heavy, \$5.50;

Light.....\$5.00

Crow Bars—See Bars, Crow.**Cultivators—**

Victor Garden.....50%

Cutlery, Table—

International Silver Company:
No. 12 M'd'm Knives, 1817, \$1 doz. \$3.50
Star, Eagle, Rogers & Hamilton
and Anchor.....\$1 doz. \$3.00
Wm. Rogers & Son.....\$1 doz. \$2.50

Cutters—

H. H. Mayhew Co.....40%

Red Devil.....50%

Smith & Hemenway Co.....50%

Woodward.....40%

Meat and Food—

American.....30%
No. 401 402 403 404 405 \$24.00
Each.....\$5 \$7 \$10 \$12 \$23 \$50 \$60
Enterprise:
Nos. 5 10 12 22 32
Each.....\$2 \$3 \$2.75 \$1.50 \$6 25¢ @ 7 1/2%
No. 202, \$1.50.....40¢ @ 7 1/2%
Dixon's.....\$1 doz. 33 1/4%
Nos.....\$14.00 \$17.00 \$19.00 \$30.00

Ideal.....40¢ @ 40¢ @ 5%
Hales.....60¢ @ 10¢ @ 5%
Little Giant.....\$1 doz. 40¢ @ 50%

Nos. 305 310 312 320 322
\$33.00 \$48.00 \$44.00 \$72.00 \$68.00

N. E. Food Choppers.....25%

New Triumph No. 605, \$1 doz. \$24.00.

Russwin Food, No. 1, \$24.00; No. 2,
\$27.00.....45¢ @ 10¢ @ 10%

Woodruff's.....\$1 doz. 30¢ @ 30¢ @ 5%

Nos. 100 150
\$15.00 \$18.00

Enterprise Beef Shavers.....25¢ @ 30%

Slaw and Kraut—

Henry Disston & Sons:
Slaw and Kraut Cutters.....35%
Corn Graters.....30%
J. M. Mast Mfg. Co.:
Slaw Cutters, 1 Knife.....\$1 doz. \$3.00
Combined Slaw Cutter and Corn
Grater.....\$1 doz. \$4.00
Tucker & Dorney Mfg. Co.:
Kraut Cutters.....40%
Slaw Cutters, 1 Knife.....\$1 gr. \$18¢ @ 20¢
Slaw Cutters, 2 Knife.....\$1 gr. \$22¢ @ 24¢

Tobacco—

All Iron, Cheap.....doz. \$1.25 @ \$1.50
Enterprise.....25¢ @ 30%
National, \$1 doz., No. 1, \$21; No. 2,
\$18.....40%

Diggers, Post Hole, &c.—

Disston:
Rapid, \$1 doz., \$24.00.....25%
Samson, \$1 doz., \$34.00.....25%
Iwan's Improved Post Hole Auger.....40%
Vaughan Pattern Post Hole Augers,
\$1 doz., \$7.00

Perfection Post Hole Diggers, \$8.75

Split Handle Post Hole Diggers, \$7.75

Hercules Pattern, \$1 doz., \$10.00

Kohler's, \$1 doz., Universal, \$15.00;

Little Giant, \$12.00; Hercules,
\$10.00; Invincible, \$9.00; Rival,
\$8.50; Pioneer.....\$7.50

Never-Break Post Hole Diggers, \$1

doz., \$24.00.....60%

Dividers—See Compasses.**Drawers, Money—**

Tucker's Pat. Alarm Till No. 1, \$1
doz., \$15; No. 2, \$15; No. 3, \$12;
No. 4, \$13.

Drawing Knives—

See Knives, Drawing.

Dressers, Emery Wheel—

Sterling Emery Wheel Dressers.....35%
Sterling Wheel Dresser Cutters.....35%

Drills and Drill Stocks—

Blacksmiths' Common Drilling
Machines.....\$1.50 @ \$1.75

Breast, Millers Falls.....40%
Breast, P. S. & W.....35%
Goodell Automatic Drills, 50¢ @ 10¢ @ 10%

Millers Falls Automatic Drills, 33¢ @ 10%

Hoes— Eye—
Scovill and Oval Pattern.....
60¢10¢@75¢10¢
Grub, list Feb. 23, 1899.....
70¢10¢@75¢10¢
D. & H. Scovill.....
Scovill Pattern.....

NOTE—Manufacturers are selling from the list of September 1, 1904, but many jobbers are still using list of August 1, 1899, or selling at net prices.
Cronk's Weeding, No. 1, \$2.00; No. 2, \$2.50
Star Double Bit.....
Ft. Madison Cotton Hoe.....
Ft. Madison Crescent Cultivator Hoe.....
Ft. Madison Mattcock Hoes:
Regular Weight.....
Junior Size.....
Ft. Madison Sprouting Hoe.....
Ft. Madison Dixie Tobacco Hoe.....
Kretzinger's Cut Easy.....
Warren Hoe.....
W. & C. Ivanhoe.....
B. B. 6 in. Cultivator Hoe.....
B. B. 6 in. Hoe.....
Acme Weeding.....
W. & C. L'ning Shuffie Hoe.....

Hoisting Apparatus—
See Machines, Hoisting.
Holders— Bit—
Angular, # doz. \$24.00.....
Door—
Bardsley's, Iron, 10%; Brass and Bronze.....
Empire.....
Fullman.....
Superior.....

File and Tool—
Nicholson File Holders and File Handles.....
Fruit Jar—
Triumph Fruit Jar Holder, # gross, \$10.80; # doz. \$1.25

Trace and Rein—
Fernald Double Trace Holder, # doz. pairs.....
Dash Rein Holder, # doz. pairs.....
Hones—Razor—
Pike Mfg. Co., Belgian, German and Swaty.....

Hooks—Cast Iron—
Bird Cage, Reading.....
Clothes Line, Reading List.....
Clothes Line, Stowell's.....
Coat and Hat, Stowell's.....
Coat and Hat, Wrightsville.....
Harness, Reading List.....
Harness, Stowell's.....
School House, Stowell's.....
Wire—
Belt.....
Wire C. & H. Hooks.....
Columbian Hdw. Co., Gem.....
Bradley Metal Clasp Wire, Coat and Hat, 70¢10¢; Ceiling.....
Parker Wire Goods Co., King.....
Western W. G. Co. Molding.....
Wire Goods Co.:
Acme, 60¢10¢; Chief, 70¢; Crown, 75¢; Czar, 65¢; V Brace, 75¢; Czar Harness, 50¢10¢.

Wrought Iron—
Box, 6 in., per doz. \$1.00; 8 in., \$1.25; 10 in., \$2.50.
Cotton.....
Wrought Staples, Hooks, &c.—
See Wrought Goods.
Miscellaneous—
Hooks, Bench, see Stops, Bench.
Bush, Light, doz. \$5.75; Medium, \$6.35; Heavy, \$7.25
Grass, best, all sizes, per doz. \$3.00
Grass, common grades, all sizes, per doz. \$1.75
Whiffletree.....
Hooks and Eyes:
Brass.....
Malleable Iron.....
Cover Mfg. Co. Gate and Scuttle Hooks.....
Ft. Madison Cut-Easy Corn Hooks.....
Turner & Stanton Co. Cup and Shoulder.....
Bench L. 3. See Bench Stops.
Corn Hooks—See Knives, Corn.

Horse Nails—
See Nails, Horse.
Horseshoes—
See Shoes, Horses.
Hose, Rubber—
Garden Hose, 3/4-inch:
Competition.....
3-ply Guaranteed, ft. 8 @ 9¢
4-ply Guaranteed, ft. 10 @ 11¢
Cotton Garden, 3/4-in., coupled:
Low Grade.....
Fair Quality.....

Irons— Sad—
From 4 to 10.....
B. B. Sad Irons.....
Mrs. Potts' cents per set:
Nos. 50 55 60 65
Jap'd Tops.....
Tin'd Tops.....
New England Pressing, lb. 3¢ @ 1¢
Pinking—
Pinking Irons.....
Irons, Soldering—
See Conners.
Jacks, Wagon—
Cover Mfg. Co.:
Auto Screw.....
Lockport.....
Lane's Steel.....
Richards' Tiger Steel, No. 130.....
Smith & Hemenway Co.'s.....

Kettles—
Brass, Spun, Plain.....
Enamelled and Cast Iron—See Ware, Hollow.

Knives—
Butcher, Kitchen, &c.—
Foster Bros. Butcher, &c.....
Wilkinson Shear & Cutlery Co.....

Corn—
Wilkinson Shear & Cutlery Co.:
Wilcut Brand Knives and Hooks.....
Wilmington Acme.....
Dent, \$2.75; Adj. Serrated, \$2.20;
Serrated, \$2.10; Yankee No. 1, \$1.50;
Yankee No. 2, \$1.15.

Drawing—
Standard List.....
C. E. Jennings & Co., Nos. 45, 46,
Jennings & Griffin, Nos. 41, 42,
Swan's.....
Watrous.....
L. & J. White.....

Hay and Straw—
Serrated Edge, per doz. \$5.50 @ 5.75
Iwan's Sickle Edge.....
Iwan's Serrated.....

Miscellaneous—
Farriers'.....
Wostenholm's.....
Knobs—
Base, 2 1/2-inch, Birch, or Maple,
Rubber Tip.....
Carriage, Jap., all sizes.....

Lacing, Leather—
See Belting, Leather.
Ladders, Store, &c.—
Allith Mfg. Co., Reliable.....
Lane's Store.....
Myers' Noiseless Store Ladders.....
Richards Mfg. Co.:
Improved Noiseless, No. 112.....
Climax Shelf, No. 113.....
Trolley, No. 109.....

Ladles, Melting—
L. & G. Mfg. Co. (low list).....
P. & W.....

Lanterns—Tubular—
Regular, No. 0.....
Side Light, No. 0.....
Hinge Globe, No. 0.....
Other Styles.....
Bull's Eye Police—
3-inch.....

Lasts and Stands, Shoe—
Stowell's Atlas, Malleable Iron.....
Stowell's Badger, Cast Iron.....

Latches—Thumb—
Roggin's Latches, with screw.....
Door—
Allith Mfg. Co., Reliable and Allegator, 50%; Reliable Cold Storage, 50%; Cronk & Carrier Mfg. Co., No. 101, 123.....
Richards' Bull Dog, Heavy, No. 123.....
Richards' Trump, No. 127.....
Stowell's Steel.....

Leaders, Cattle—
Small.....
Cover Mfg. Co.:
Cotton, 45%; Hemp, 45%; Jute, 35%; Sisal, 20%.

Leathers, Pump—
See Pumps.
Lifters, Transom—
R. & E.....

Lines—
Wire Clothes, Nos. 18 19 20
100 feet.....
75 feet.....
Samson Cordage Works:
Solid Braided Chalk, Nos. 0 to 3, 40%; Solid Braided Masons'.....
Silver Lake Braided Chalk, No. 0, \$6.00; No. 1, \$6.50; No. 2, \$7.00; No. 3, \$7.50.....
Masons' Lines, Shade Cord, &c.:
White Cotton, No. 3/4, \$1.50; No. 4, \$2.00; No. 4 1/2, \$2.50; Colors, No. 3/4, \$1.75; No. 4, \$2.25; No. 4 1/2, \$2.75; Linen, No. 3/4, \$2.50; No. 4, \$3.50; No. 4 1/2, \$4.50.....
Tent and Awning Lines: No. 5, White Cotton, \$7.50; Drab Cotton, \$8.50.....
Clothes Lines, White Cotton: 50 ft., \$2.75; 60 ft., \$3.25; 70 ft., \$3.75; 75 ft., \$4.00; 80 ft., \$4.25; 90 ft., \$4.75; 100 ft., \$5.25.....

Turner & Stanton Co.:
Solid Braided Chalk, Masons' and Awning Lines.....
Clothes Lines White Cotton.....
Shade Cord, Cotton or Linen.....

Locks— Cabinet—
Cabinet Locks.....
Door Locks, Latches, &c—
NOTE—Net Prices are very often made on these goods.
Reading Hardware Co.....
R. & E. Mfg. Co.....
Stowell's.....

Padlocks—
R. & E. Mfg. Co. Wrought Steel and Brass.....
Sash, &c.—
Ives' Patent:
Bronze and Brass, 55¢5%; Crescent, 60%; Iron, 60%; Window Ventilating, 40¢20%; Robinson Pat. Ventilating Sash Lock, 33¢4%.

Fullman Patent Ventilating Lock.....
Reading.....

Machines—Boring—
Com. Up'r, without Augers.....
Com. Ang'r, without Augers.....
Com. Ang'r, without Augers.....

Mallets—
Hickory.....
Lignumvite.....
Tinnars' Hickory and Applewood.....
Mangers, Stable—
Sweet Iron Works.....

Mashers, Vegetable—
Western, W. G. Co., Potato.....
Mats, Door—
Elastic Steel (W. G. Co.), new list.....
Keystone Wire Matting Co.:
Keystone.....
Ideal.....

Mattocks—
See Picks and Mattocks.
Milk Cans—See Cans, Milk.
Mills, Coffee, &c.—
Enterprise Mfg. Co.....
National list, Jan. 1, 1902.....
Parker's Columbia and Victoria.....
Parker's Box and Side.....
Swift, Lane Bros. Co.....

Motors Water—
Divine's Red Devil.....
Mowers, Lawn—
NOTE—Net prices are generally quoted Cheapcut.....
Cheap.....
Better Grade.....
High Grade.....
Continental.....
Great American.....
Great American Ball B'g, new list.....
Quaker City.....
Pennsylvania, Jr., Ball Bearing.....
Pennsylvania Golf.....
Pennsylvania Horse.....
Pennsylvania Pony.....
Granite State:
Style A, Low Wheel.....
Style B, Low Wheel.....
Style C, High Wheel, spl. disc.....
Style D, High Wheel, spl. disc.....
Philadelphia:
Styles M, S, O, K, T.....
Style A, All Steel.....
Style B, High Wheel.....
Drexel and Gold Coin, special list.....
Horse.....
Pony.....
36-in. Horse.....
Eagle Horse.....
I. X. L. Horse.....

Nails—
Wire Nails and Brads, Miscellaneous.....
Cut and Wire. See Trade Report.
Hungarian, Finishing, Upholsterers' &c. See Tacks.
Horse—
Nos. 6 7 8 9 10
Anchor.....
Champion.....
Coleman.....
New Haven.....
Livingston.....
Western.....
Jobbers' Special Brands.....
Picture—
Brass H'd.....
Por. Head.....
Nippers—
See Pliers and Nippers.
Nuts—
Cold Punched:
Square, Blank or Tapped.....
Hexagon, Blank or Tapped.....
Square, B'F, C, T. & R.....
Hexagon, B'F, C, T. & R.....
Hot Pressed:
Square, Blank.....
Hexagon, Blank.....
Square, Tapped.....
Hexagon, Tapped.....

Oakum—
Rest.....
U. S. Navy.....
Navy.....
Plumbers' Spun Oakum.....
In carload lots 1/4 lb. off, f.o.b. New York.
Oil Tanks—See Tanks, Oil.
Oilers—
Brass and Copper.....
Tin or Steel.....
Zinc.....

Chase or Paragon:
Brass and Copper.....
Tin or Steel.....
Zinc.....
Malleable, Hammers' Improved, Nos. 11, 12 and 13, 20%; Old Pattern, Nos. 1, 2, 3, 50%.
American Tube & Stamping Co.:
Spring Bottom Cans.....
Railroad Oilers, &c.....
Openers— Can— Per doz.
Sprague, Iron Handle.....
Sprague, Wood Handle.....
Sardine Scissors.....
Vim Tin Shear and Can Opener.....
Yankee Can and Bottle Opener.....
Nickel Plate, # doz., \$2.00; Silver Plate, \$4.00.
Packing—
Asbestos Packing, Wick and Rope.....
Rubber—
(Fair quality goods.)
Sheet, C. I.....
Sheet, C. O. S.....
Sheet, C. B. S.....
Sheet, Pure Gum.....
Sheet, Red.....
Jenkins' No. 1.....
Miscellaneous—
American Packing.....
Cotton Packing.....
Italian Packing.....
Jute.....
Russia Packing.....
Pails, Creamery—
R. M. Co., with gauges, # doz., No. 1, \$6.25; No. 2, \$6.50.
Pails, Water, Well, &c.—
See Buckets.
Pans— Dripping—
Standard List.....
Edwards, Royal Blue.....
Fry—
Nos. 1 2 3 4 5
Per doz. \$0.75 0.80 0.90 1.10 1.30
Refrigerator, Galva.—
Inch.....
Per doz.....
Roasting and Baking—
Real, R. M. Co., # doz., Nos. 5, \$4.50; 10, \$5.25; 20, \$5.75; 30, \$6.25.
Savory, # doz., net, Nos. 200, \$9.00; 400, \$15.00.
Simplex, # gro.:
No. 40 50 60 140 150 160
\$30.00 35.00 42.00 31.00 39.00 46.00
Paper—Building Paper
Asbestos.....
Roll Board or Building Felt, 6 to 30 lb., per 100 sq. ft. \$3.50 @ 5¢
Roll Board or Building Felt, 3-32 and 1/4 in., 45 to 60 lb., per 100 sq. ft. \$3.50 @ 5¢
Mill Board, Sheet, 40 x 40 in., 1-32 to 1/4 in. \$3 @ 5¢
Per roll
Rosin Sized Sheathing: 500 sq. ft. Light weight, 25 lbs. to roll \$4 @ 5¢
Medium weight, 30 lbs. to roll \$4 @ 5¢
Heavy weight, 40 lbs. to roll \$4 @ 5¢
Black Water Proof Sheathing, 500 sq. ft., 1 ply, 65¢; 2 ply, 85¢; 3 ply, \$1.10; 4 ply, \$1.25.
Deafening Felt, 8, 6 and 1/4 sq. ft. to lb. ton.....
Red Rope Roofing, 250 sq. ft. per roll.....
Tarred Paper—
1 ply (roll 400 sq. ft.), ton.....
2 ply, roll 108 sq. ft. \$31.00 @ 35¢
3 ply, roll 108 sq. ft. \$31.00 @ 35¢
Slater's Felt (roll 500 sq. ft.), 70¢
Sand and Emery—
Flint Paper and Cloth 50¢10¢
Garnet Paper and Cloth.....
Emery Paper and Cloth.....
Parers— Apple—
Advance.....
Baldwin.....
Bonanza Improved.....
Daisy.....
Dandy.....
Eureka Improved.....
Family Bay State.....
Improved Bay State.....
Little Star.....
New Century.....
New Lightning.....
Ranger.....
Reading 72.....
Reading 75.....
Rocking Table.....
Turn Table.....
White Mountain.....
Potato—
Saratoga.....
White Mountain.....
Picks and Mattocks—
List, Feb. 23, 1899.....
Cronk's Handled Garden Mattock, # doz., No. 2, \$2.00; No. 3, \$3.00.
Pinking Irons—
See Irons, Pinking.
Pincers—
Vaughan & Bushnell Mfg. Co.:
Blacksmiths', per doz., 10 in., \$5.00; 12 in., \$5.50; 14 in., \$6.00.
Carpenters' Claw, per doz., 6 in., \$2.00; 8 in., \$2.75; 10 in., \$3.50.
Pins, Escutcheon—
Iron, list Nov. 11, '85.....

Pipe, Cast Iron Soil—
Standard, 2-6 in. 40¢@10¢5
Extra Heavy, 2-6 in. 50¢@12¢5
Fittings 60¢@10¢5

Pipe, Merchant—
Consumers, Carloads.
Steel.
Blk. Galv. Blk. Galv.
1/4 & 1/2 in. 65 78 57 41
3/4 in. 66 52 59 41
1 in. 68 56 61 49
1 1/4 to 6 in. 72 62 66 56
7 to 12 in. 69 53 61 46

Pipe, Vitrified Sewer—
Carload lots.
Standard Pipe and Fittings, 3
to 24 in., f.o.b. factory: .82%
First-class82%
Second-class85%
NOTE.—Market irregular.

Pipe, Stove—
Per 100 joints.
Edwards' Nested: C. L. L. C. L.
5 in., Standard Blue \$7.25
6 in., Standard Blue 7.75
7 in., Standard Blue 8.25
5 in., Royal Blue 7.00
6 in., Royal Blue 7.50
7 in., Royal Blue 8.50
Wheeling Corrugating Co.'s Nested:
3 in., Uniform Color \$7.15
5 in., Uniform Color 7.65
7 in., Uniform Color 8.65

Planes and Plane Irons—
Wood Planes—
Bench, first qual. 30¢@30¢10
Bench, second qual. 40¢@40¢10
Molding 25¢@25¢10
Bailey's (Stanley R. & L. Co.) 35¢@25¢
Chapin-Stephens Co.:
Bench, First Quality 30%
Bench, Second Quality 40%
Molding and Miscellaneous 25%
Toy and German 30%
Union 60%

Iron Planes—
Bailey's (Stanley R. & L. Co.) 35%
Chapin's Iron Planes 50¢@10%
Miscellaneous Planes (Stanley R. & L. Co.) 30¢@5%
Union 60%

Wood Bench Plane Irons, list
Dec. 12, '06 25%
Buck Bros. 30%
Chapin-Stephens Co. 25%
Stanley R. & L. Co. 50%
Union 60%
L. & J. White 20¢@25%

Planters, Corn, Hand—
Kohler's Eclipse 40¢ doz. \$8.00

Plates—
Fellows 10¢@14¢
Self-Sealing Pie Plates (B. M. Co.) 40¢ doz. \$2.00 50%

Pliers and Nippers—
Button Pliers 75¢@75¢10
Gas Burner, per doz., 5 in., \$1.25
@ \$1.30; 6 in., \$1.45 @ \$1.50.
Gas Pipe, 7 8 10 12-in.
\$2.00 \$2.25 \$2.75 \$3.50
Acme Nippers 50¢@5%
Cronk & Carrier Mfg. Co.:
American Butt 80%
Improved Button 75¢@10%
No. 60 Linemen's 50%
Stub's Pattern 45%
Combination and others 35%
Heller's Farriers' Nippers, Pincers
and Tools 40¢@40¢10
The Nettleton Mfg. Co. Reversible
Cutting Nippers 40%
P. S. & W. Timmers' Cutting Nip-
pers 40%

**Wm. Schollhorn Co.:
Bernard, 33 1/2%; Elm City, 33 1/2%;
Paragon, 50%; Lodi, 50%.
Swedish Slide, End and Diagonal Cut-
ting Pliers 50%
Utica Drop Forge & Tool Co.:
Pliers and Nippers, all kinds 40%
Vaughan & Bushnell Mfg. Co.:
Gas Burner, per doz., 5 in., \$2.50;
6 in., \$3.00.
Gas, per doz., 7 in., \$3.50; 8 in.,
\$3.75; 10 in., \$4.50.
Nippers, Horsehoofers' Cutting, 40%
Hoof Paring 10%**

Plumbs and Levels—
Chapin-Stephens Co.:
Plumbs and Levels 30¢@30¢10
Chapin's Imp. Brass Cor. 40¢@40¢10
Pocket Levels 30¢@30¢10
Extension Sights 30¢@30¢10
Machinists' Levels 40¢@40¢10
Diston's Plumbs and Levels 60¢@10%
Diston's Pocket Levels 60¢@10%
Stanley R. & L. Co. 40%
Stanley's Duplex 30%
Woods' Extension 35%

Poachers, Egg—
Buffalo Steam Egg Poachers, 40¢ doz.
No. 1, \$8.00; No. 2, \$9.00; No. 3,
\$9.00; No. 4, \$12.00. 50%

Points, Glaziers—
Bulk and 1-lb. papers, 10¢ 10¢
1/4-lb. papers 10¢@10¢10
1/2-lb. papers 10¢@10¢10

Police Goods—
Manufacturers' Lists 25¢@25¢10
Tower's 25%

Polish—Metal, Etc—
Glasbrite, 2, 5 lb can (powder),
each, \$1.25; 10 lb can, \$2.00; No. 2, 10 lb
can (cake), each, \$2.50; 10 lb can, \$3.00.
Prestoline Liquid, No. 1 (1 qt.), 40¢
doz., \$3.00; No. 2 (1 qt.), \$2.00, 40¢
Prestoline Paste 40%
George William Hoffman:
U. S. Metal Polish Paste, 3 oz.
boxes, 40¢ doz. \$4.00; 1 lb
boxes, 40¢ doz. \$1.25; 1 lb
boxes, 40¢ doz. \$2.25.

U. S. Liquid, 8 oz. cans, 40¢ doz.,
\$1.25.
Barkeepers' Friend Metal Polish, 40¢
doz., \$1.75.

Stove—
Black Eagle Benzine Stove, 5 lb cans,
10 lb cans, 10 lb cans,
Black Eagle, Liquid, 1/2 pt. cans,
Black Kid Paste, 5 lb cans, each, \$0.65
Ladd's Black Beauty Liquid, per
100 tins \$6.75
Joseph Dixon's, 40¢ gr. \$5.75 10%
Dixon's Plumbago 10%
Fireside 40¢ gr. \$2.50
Gem, 40¢ gr. \$1.50 10%
Japanese 40¢ gr. \$3.50
Jet Black 40¢ gr. \$3.50
Peerless Iron Enamel, 10 oz. cans 40%
40¢ doz. \$1.50

Poppers, Corn—
1 qt. Square, doz. \$0.88; gro. \$8.75
1 qt. Round, doz. \$1.00; gro. \$10.00
1 1/2 qt. Square, doz. \$1.10; gro. \$11.00
2 qt. Square, doz. \$1.35; gro. \$13.50

**Post Hole and Tree Au-
gers and Diggers—**
See also Diggers, Post Hole, etc.
Posts, Steel—
Steel Fence Posts, each, 5 ft., 42¢;
6 ft., 46¢; 6 1/2 ft., 48¢.
Steel Hitching Posts, each \$1.30

Potato Parers—
See Parers, Potato.
Pots, Glue—
Enamel 35¢@10%
Tinned 30¢@10%

Powder—
In Canisters:
Duck, 1 lb each 45¢
Fine Sporting, 1 lb each 75¢
Rifle, 1/2 lb each 15¢
Rifle, 1 lb each 25¢
In Kegs:
12 1/2-lb. keys \$3.50
25-lb. keys \$4.50
King's Semi-Smokeless:
Keg (25 lb bulk) \$6.50
Half Keg (12 1/2 lb bulk) \$3.50
Quarter Keg (6 1/4 lb bulk) \$1.90
Case 24 (1 lb cans bulk) \$3.50
Half case (1 lb cans bulk) \$4.50
King's Smokeless: Shot Gun, Rifle,
Keg (25 lb bulk) 6.25
Half Keg (12 1/2 lb bulk) 3.25
Quarter Keg (6 1/4 lb bulk) 4.00
Case 24 (1 lb cans bulk) 14.00
Half case (1 lb cans bulk) 7.25
Robin Hood Shot Gun, 50¢@20%

Presses—
Fruit and Jelly
Enterprise Mfg. Co. 20¢@25%
Seal Presses—
Morrill's No. 1, 40¢ doz., \$20.00 50%
Pruning Hooks and Shears
See Shears.
Pullers, Nail—
Cyclops 50%
Miller's Falls, No. 3, 40¢ doz., \$12.00 35%
Morrill's No. 1, Nail Puller, 40¢ doz. 50%
Pearson No. 1, Cyclone Spike Puller,
each \$3.00, doz. \$36.00 50%
The Scranton Co. Case Lots:
No. 2B (large) \$3.50
No. 3B (small) \$3.00
Smith & Hemenway Co.:
Diamond B. case lots, 40¢ doz., Large,
\$9.00; Small, \$7.50.
Giant No. 1, 40¢ doz., \$18; No. 1 1/2,
\$16.50; No. 3, \$15 35%
Staple Pullers, Utica and Davi-
son 60%
Parrot Tack and Stub Puller, 40¢ doz.
75¢; 40¢ doz. \$6.00

Pulleys, Single Wheel—
Inch 1/4 1/4 1/4 1/4
Aurum or Tackle 30 35 60 1.05
Hay Fork, Electric or Solid Eye,
doz., 4 in., \$1.25; 5 in., \$1.55
Inch 2 1/4 1/4 1/4
Hot House, doz. \$0.65 85 1.20
Inch 1/4 1/4 1/4
Screw, doz. \$0.16 19 33 30
Inch 1/4 1/4 1/4
Side, doz. \$0.25 19 33 30
Inch 1/4 1/4 1/4

**Stowell's:
Ceiling or End, Anti-Friction, 60¢@10%
Dumb Waiter, Anti-Friction, 60¢@10%
Electric Light 60%
Side, Anti-Friction 60¢@10%
Sash Pulleys—
Common Frame; Square or
Round End, per doz, 1 1/4 and
2 in. 10¢@10%
Auger Mortise, no Face Plate,
per doz., 1 1/4 and 2 in. 10¢@10%
Acme, No. 35, 1 1/4 in., 18¢; 2 in., 20¢
Fox-All-Steel, Nos. 3 and 4, 2 in. 20%
Grand Rapids All Steel Noiseless 50%
Ideal 70¢@5%
Niagara, No. 25, 1 1/4 in., 18¢; 2 in.,
20¢ 20%
No. 28, 2 in., 1 1/4 in., 18¢; 2 in., 16¢
Star, No. 26, 1 1/4 in., 18¢; 2 in., 20¢
Tangle Ropes—See Blocks.**

Pumps—
Cistern 60%
Pitcher Spout 75¢@75¢10
Wood Pumps, Tubing, etc. 45¢@50%
Rarnes Dbl. Acting (low list) 45%
Rarnes Pitcher Spout 75¢@5%
Contractors' Rubber Diaphragm No.
2 B. & L. Wood Co. \$16.00
Daisy Spray Pump, 40¢ doz. \$8.00
Flint & Walling's Fast Mail Hand,
(low list) 50%
Flint & Walling's Fast Mail (low
list) 50%
Flint & Walling's Tight Top Pitcher,
75¢@10%

National Specialty Mfg. Co. Measur-
ing, Nos. 2, \$6.00; 3, \$5.50 30%
Myers' Pumps (low list) 45%
Myers' Power Pumps 45%
Myers' Spray Pumps 45%

Pump Leathers—
Plunger and Lower Valve—Per
gro.:
Inch 2 2 1/4 2 1/4 2 1/4
\$2.20 2.50 2.75 3.00
Inch 3 3 1/4 3 1/4 3 1/4
\$3.30 3.60 3.85 4.10 4.40
Plunger Cup Leathers—Per 100:
Inch 2 1/2 3 3 1/2 4
\$2.75 3.85 5.00 6.00

Punches—
Saddlers' or Drive, good
doz. 50¢@75¢
Spring, single tube, good qual-
ity \$1.75@2.00
Revolving (4 tubes)
doz. \$3.50@3.75

Bemis & Call Co.'s Cast Stl Drive, 50%
Morrill's Nos. 1AA, 1A, 1B, 1C,
1D 50%
Hercules, 1 die, each \$5.00 50%
Niagara Hollow Punches 40%
Niagara Solid Punches 55¢@10%
Wm. Schollhorn Co.:
Belt and Ticket, Bernard, 33 1/2%;
Paragon, 50%; Lodi, 50% 50%
Timmers' Hollow, P. S. & W. Co. 40%
Timmers' Solid, P. S. & W. Co. 40%
doz., \$1.41 40%

Rail—Barn Door, &c.—
Sliding Door, Painted Iron
2 1/4@2 1/4¢

Sliding Door, Wrought Brass—
1 1/2 in., lb., 30¢ 30%
Allith Mfg. Co.: Reliable Hanger
Track 50%
Cronk's:
Double Braced Steel Rail, 40¢ ft. 3 1/4¢
O. N. T. Rail \$3.12
Griffin's:
XXX, 100 ft., 1 x 3-16 in., \$3.25;
1 1/4 x 3-16 in., \$3.75;
Hinged Hanger, 100 ft., 1 x 3-16
in., \$3.50; 1 1/4 x 3-16 in., \$4.00.
Lane:
Hinged Track, 100 ft. \$3.45
O. N. T., 100 ft., 1 in., \$3.00; 1 1/4
in., \$3.45; 1 1/2 in., \$4.00.
Standard, 100 ft. \$4.00
Lawrence Bros.:
1 x 3-16 in., 100 ft., \$7.50; 1 1/4 x
3-16 in., \$8.75 55¢@7 1/2%
McKinty:
Hinged Hanger Track, 40¢ ft., 11¢
1 x 3-16 in. 55¢@7 1/2%
Myers' Stayon Track 60¢@5%
Richards' Mfg. Co.:
Common, 1 x 3-16 in., \$3.00; 1 1/4 x
3-16 in., \$3.25; 1 1/2 x 3-16 in., \$3.50.
Special Hinged Hanger Rail, 60¢@10%
Lag Screw Rail, No. 60 50%
Gauge Trolley Track, 40¢ ft., No. 31,
9¢; No. 32, 14¢; No. 33, 20¢
No. 50 60¢@10%
Nos. 61, \$3.00; 62, \$3.25; 63, \$3.50; 64,
\$3.75; 45, \$3.25; 46, \$3.50; 49, No. 1,
\$3.25; No. 2, \$3.50.

Rakes—
NOTE.—Many goods are sold
at net prices.
Fort Madison Red Head Lawn \$3.25
Fort Madison Blue Head Lawn \$2.70
Cronk's:
Steel Garden: Champion, 75%
Ideal, 80%; Victor, 80¢@25%
Queen City Lawn, 40¢ doz., 20 teeth,
\$2.85; 21, \$3.00 40%
Anticlog Lawn, 40¢ doz. \$1.00
Malleable Garden 70¢@10%
Ideal Steel Garden, 40¢ doz., 12 teeth,
\$15.00; 11, \$16.00; 16, \$18.00 80%
Kohler's:
Lawn Queen, 20-tooth 40¢ doz. \$3.15
Lawn Queen, 24-tooth 40¢ doz. \$3.25
Paragon, 20-tooth 40¢ doz. \$2.70
Paragon, 24-tooth 40¢ doz. \$2.75
Steel Garden, 14-tooth 40¢ doz. \$2.40
Malleable Garden, 14-tooth, 40¢ doz. \$2.00@2.25

Rasps, Horse—
Diston's 75%
Heller Bros. 70¢@50¢70¢10
Liveright Bros. Cold Metal 70¢@10¢75%
McCaffrey's American Standard 70%
New Nicholson 70¢@10¢75%
See also Files.
Razors—
Liana Bo-ras-ic 60%
Fox Razors, 40¢ doz., No. 42, \$2.00;
No. 41, \$2.00; No. 42, Platina, 35¢
\$25.00.
Red Devil 50%
Silberstein:
Carbo Magnetic, \$21.00; Griffin No.
65, \$13.50; Griffin No. 00, \$12.00;
all other Razors, 40%.

Safety Razors—
Kampfe Bros.:
Star Safety, 25%; Star Interchange-
able, 25%; Star Safety Corn, 25%.
Silberstein 40%

Reels, Fishing—
Hendryx:
M 6, Q 6, A 6, B 6, M 9 1/4, M 16,
Q 16, A 16, B 16, 4008, Rubber,
Populo, Nickelated Populo 20%
Aluminum German Silv., Bronze, 25%
1240 N, 12 N 20%
3204 N, 06 N, 6 RM, 9 1/2 25%
4 N, 6 PN, 21 N, 26 PN 30%
2204 P, 33 1/4; 2204 PN, 33 1/4; 0624 N,
33 1/4; 02084 N, 33 1/4; 002904 PN,
33 1/4; 802 N, 33 1/4 25%
966 PN, 2504 N, 974 PN 25%
5009 PN, 5009 N 20%

Competitor, 102 P, 102 PN, 202 P,
202 PN, 102 P, 102 PN, 202 P, 202 PN,
304 P, 304 PN, 00304 P, 00304 PN, 33 1/4%
Registers—List July 1, 1908.
Japanned, Electroplated and
Bronzed 66%
White Porcelain Enamel 60%
Solid Brass or Bronze Metal, 40¢@10%

Revolvers—
Single Action 95¢@1.00
Double Action, except 4 1/2 cal. \$1.80
Double Action, 4 1/2 caliber \$2.00
Automatic \$3.00
Hammerless \$4.50

Riddles, Hardware Grade
16 in. per doz. \$2.50@2.75
17 in. per doz. \$2.75@3.00
18 in. per doz. \$3.00@3.25

Rings and Ringers—
Bull Rings—
Steel \$0.70 0.75 0.80 doz.
Copper \$1.15 1.35 1.75 doz.
Ken's Improved Self-Piercing, 40¢ doz.
Copper, 2 in., \$1.25; 2 1/2 in., \$1.50;
3 in., \$1.75.

Hog Rings and Ringers—
Hill's Rings, gro. boxes \$4.00@4.50
Hill's Ringers, Gray Iron
doz. 50¢@55¢
Hill's Ringers, Malleable Iron
doz. 70¢@75¢

Blair's Rings, per gro. \$4.75@5.25
Blair's Ringers, per doz. \$0.60@.65
Brown's Rings, per gro. \$5.00@5.50
Brown's Ringers, per doz. \$0.60@.65

Rivets and Burrs—
Copper 33 1/4¢@35%
Carriage, Coopers', Tanners', etc.:
Black 70¢@10%
Metallic Tinned 70%
Bifurcated and Tubular—
Assorted in Boxes.
Bifurcated, per doz. boxes, paste-
board boxes, 23¢@25¢; Tin boxes,
29¢@32¢.

**Tubular, per doz. boxes, 50 count,
2¢; 100 count, 51¢@58¢.**

Rollers—
Acme, Stowell's Anti-Friction 50%
Cronk's Stay, No. 50 \$1.00
Cronk's Strikerhoff No. 55, \$0.60;
No. 56, \$0.75; No. 60 \$0.75
Lane's Stay 40%
Richards' Stay:
Handy Adj. and Reversible No. 53, 75¢;
O. K. Adj. and Reversible No. 58, 50¢
Lag Screw, Nos. 55 and 57 50%
Underwriters', Nos. 59, 60 50%
Favorite, No. 54 60%
Stowell's Barn Door Stay, 40¢ doz. \$1.00
Swett's Anti-Friction 50%
Screw and Spike Stay 40¢ doz. 65¢
Hinge Adjustable Stay 40¢ doz. 90¢

Rope—
Manila, 7-16 in. diam. and larger:
Pure 10¢, 13¢@13¢
Sisal, 7-16 in. diam. and larger:
Pure 10¢, 13¢@13¢
Sisal, 7-16 in. diam. and larger:
No. 2 quality 10¢, 13¢@13¢
Sisal, 1/4 in. diam. and larger:
Ropes, Medium and Coarse:
Mixed 10¢, 13¢@13¢
Pure 10¢, 13¢@13¢
Sisal, Tarred, Medium Lath
Yarn, Coarse and Untarred:
Mixed 10¢, 13¢@13¢
Pure 10¢, 13¢@13¢
Cotton Rope:
Best, 1/4 in. and larger 18¢@20¢
Medium, 1/4 in. and larger 16¢@17¢
Common, 1/4 in. and larger 10¢
In coils, 1/2 advance.

Wire Rope—
Thread, No. 1, 1/4 in. & up, 10¢, 9¢
Thread, No. 2, 1/4 in. & up, 10¢, 9¢
Galvanized 37 1/4¢@21 1/2%
Plain 35¢@21 1/2%

Ropes, Hammock—
Covert Mfg. Co.:
Jute, 35%; Sisal 20%

Rules
Boxwood 60¢@60¢10%
Ivory 35¢@10¢35¢10¢5%
Chapin-Stephens Co.:
Boxwood 60%
Flexfold 40%
Ivory 25¢@25¢10%
Miscellaneous 55¢@55¢10%
Stephens' Combination 55%
Stationers' 10%
Keuffel & Esser Co.:
Folding, Wood 35¢@10%
Folding, Steel 35¢@10%
Lufkin's Steel 50¢@10%
Lufkin's Lumber 50¢@10%
Stanley R. & L. Co.:
Boxwood 60%
Ivory 35¢@10%
Miscellaneous 40%
Zig Zag 40%
Zig Zag, Pin Joint 42 1/2%
Union Nut Co.:
Boxwood 60¢@60¢10%
Ivory 35¢@10¢35¢10¢10%

Sash Balances—
See Balance, Sash.
Sash Locks—See Locks, Sash.
Sash Weights—
See Weights, Sash.
Sausage Stuffers or Fillers
See Stuffers or Fillers, Sausage.
Saw Frames—
See Frames, Saw.
Saw Sets—See Sets, Saw.
Saw Tools—See Tools, Saw.

Saws—

Atkins:	
Circular	45%
Band	50% to 10%
Butcher Saws	50%
Cross Cuts	35%
One-Man Cross Cut	40%
Narrow Cross Cut	50%
Hand, Rip and Panel	35%
Miter Box and Compass	40%
Mulay, Mill and Drag	45%
Wood Saws	40% to 10%
Chapin-Stephens Co.:	
Turning Saws and Frames	30% to 10%
Diamond Saw & Stamping Works:	
Sterling Kitchen Saws	30% to 10%
Disston's:	
Circular, Solid and Ins'ted Tooth	50%
Band, 2 to 18 in. wide	60%
Hand, 4 to 14	60%
Crosscuts	45%
Narrow Crosscuts	50%
Mulay, Mill and Drag	50%
Framed Woodsaws	35%
Woodsaw Blades	25%
Woodsaw Rods, Tinned	15%
Hand Saws, Nos. 12, 9, 9, 16, 10, 100	25%
D8, 120, 76, 17, 8	25%
Hand Saws, Nos. 7, 107, 107, 3, 1	30%
0, 00, Combination	30%
Compass, Key Hole	30%
Butcher Saws and Blades	30%
C. E. Jennings & Co.:	
Back Saws	16%
Butcher Saws	25% to 7%
Compass and Key Hole Saws	35% to 7%
Framed Wood Saws	35% to 7%
Hand Saws	12%
Wood Saw Blades	33% to 7%
Millers' Saws:	
Butcher Saws	15% to 10%
Star Saw Blades	15% to 10%
Massachusetts Saw Works:	
Victor Kitchen Saws	40% to 10%
Butcher Saws	35% to 40%
Peace & Richardson's Hand Saws	30%
Simonds:	
Circular Saws	45%
Crescent Ground Cross Cut Saws	30%
One-Man Cross Cuts	40% to 10%
Gang Mill, Mulay and Drag Saws	45%
Band Saws	50%
Back Saws	25% to 25% to 7%
Butcher Saws	35% to 35% to 7%
Hand Saws	25% to 25% to 7%
Hand Saws, Bay State Brand	40%
Compass, Key Hole, &c.	25% to 25% to 7%
Wood Saws	40% to 10%
Wheeler, Madden & Clemens Mfg. Co.'s Cross Cut Saws	60%
Hack Saw Blades and Frames—	
Atkins' Hack Saw Blades A A A	25%
Disston's:	
Concave Blades	25%
Keystone Blades	35%
Hack Saw Frames	30%
Simonds File Co.	35%
C. E. Jennings & Co.:	
Hack Saw Frames, Nos. 175, 180	40% to 7%
Hack Saws, Nos. 175, 180, complete	40% to 7%
Goodell's Hack Saw Blades	40% to 10%
Griffin's Hack Saw Frames	35% to 5% to 10%
Griffin's Hack Saw Blades	35% to 5% to 10%
Star Hack Saws and Blades	30% to 10%
Sterling Hack Saw Blades	30% to 10%
Sterling Hack Saw Frames	30% to 10%
Sterling Power Hack Saw Machines, each, No. 1, \$25.00; No. 2, \$30.00, 10%	
Victor Hack Saw Blades	25%
Victor Hack Saw Frames	40%
Scroll—	
Barnes, No. 7, \$15	25%
Barnes' Scroll Saw Blades	35%
Barnes' Velocipede Power Scroll Saw without boring attachment, \$18; with boring attachment, \$20	20%
Lester, complete, \$10.00	15% to 10%
Rogers, complete, \$3.50 and \$4.00	15% to 10%
Scales—	
Family, Turnbull's	50% to 50% to 10%
Counter:	
Hatch, Platform, 1/2 oz. to 4 lbs.	50%
Two Platforms, 1/2 oz. to 8 lbs.	50%
Union Platform, Plain, \$1.70 to \$1.90	
Union Platform, Stpd, \$1.85 to \$2.15	
Chattillon's:	
Eureka	25%
Favorite	40%
Crocker's Trip Scales	50%
Chicago Scale Co.:	
The Little Detective	25% to 50%
Union Family No. 2	50%
Portable Platform (reduced list)	50%
Wagon or Stock (reduced list)	25% to 35%
The Standard Portables	45%
The Standard R. R. and Wagon	50% to 10%
Scrapers—	
Box, 1 Handle	20% to 25%
Box, 2 Handle	20% to 25%
Ship	Light, \$2.00; Heavy, \$1.50
Adjustable Box Scraper (S. R. & L. Co.)	\$6.00
Chapin-Stephens Co., Box	30% to 10%
Screws—Bench and Hand	
Bench, Iron, doz., 1 in.	\$2.50 to 2.75
2.75; 1 1/2, \$3.00 to 3.25; 1 3/4, \$3.50 to 3.75	
Bench, Wood	20% to 20% to 10%
Hand, Wood	20% to 20% to 10%
R. Bliss Mfg. Co., Hand	20% to 20% to 10%
Chapin-Stephens Co., Hand	20%
Coach, Lag and Hand Rail—	
Lag, Cone Point, list Oct. 1, '99	75% to 10%
Coach, Gimlet Point, list Oct. 1, '99	75% to 10%
Hand Rail, list Jan. 1, '81	70% to 10%
Jack Screws—	
Standard List	70% to 10% to 75%
Millers Falls	50% to 10% to 10%
Swett Iron Works	70% to 75%
Machine—	
Flat or Round Head, Iron, Brass or Bronze	50% to 50% to 10%

Fillister Head, Iron, Brass or Bronze	40% to 10% to 10%
Set and Cap—	
Set (Iron)	75% to 10% to 75%
Set (Steel), net advance over Iron	25%
Sq. Hd. Cap	70% to 10% to 75%
Hex. Hd. Cap	70% to 10% to 75%
Rd. Hd. Cap	50% to 75%
Fillister Hd. Cap	60% to 75%
Wood—	
List July 23, 1905.	
Flat Head, Iron	87% to 65% to 40%
Round Head, Iron	85% to 65% to 40%
Flat Head, Brass	80% to 65% to 40%
Round Head, Brass	77% to 65% to 40%
Flat Head, Bronze	75% to 65% to 40%
Round Head, Bronze	72% to 65% to 40%
Drive Screws	87% to 65% to 40%
Scroll Saws—	
See Saws, Scroll.	
Scythes—	
Per doz.	
Grass, No. 1, Plain	\$6.25 to \$6.75
Clipper, Bronzed Webb	\$6.50 to \$7.00
No. 3 Clipper, Pol'd Webb	\$6.75 to \$7.25
No. 6 Clipper and Solid Steel	\$7.00 to \$7.50
Bush, Weed and Bramble, No. 2	\$6.50 to \$7.00
Grain, No. 1	\$8.25 to \$8.75
Bronzed Webb, No. 1	\$8.50 to \$9.00
Nos. 3 and 4 Clipper, Grain	\$8.75 to \$9.25
Solid Steel, No. 6	\$9.25 to \$9.75
Seeders, Raisin—	
Enterprise	25% to 30%
Sets—Axl and Tool—	
Fray's Adj. Tool Handles, Nos. 1, \$12; 2, \$18; 3, \$12; 4, \$9; 5, \$7	50%
Millers Falls Adj. Tool Handles, No. 1, \$12; No. 4, \$12; No. 5, \$18, 20% to 10%	
Garden Tool Sets—	
Ft. Madison Three Plows, Hoe, Rake and Shovel	40% to 10%
Sets, Nail—	
Octagon	gro. \$3.50 to \$3.75
Hack Bros.	27% to 25%
Cannon's Diamond Point	40% to 10%
Mayhew's	40% to 10%
Snell's Corrugated Cup Pt.	40% to 10%
Snell's Knurled Cup Pt.	40% to 10%
Victor Knurled Cup Pt.	gro. \$7.50
Rivet—	
Regular list	75% to 75% to 10%
Saw—	
Atkin's:	
Criterion	40%
Adjustable	40%
Disston's Star, Monarch and Triumph	30%
Morrill's No. 1	\$15.00
Nos. 3 and 4, Cross Cut	\$20.00
No. 5, Mill	\$30.00
Nos. 10, 11, 95	\$15.00
No. 1 Old Style	\$10.00
Special	\$16.25
Giant Royal Cross Cut	40% to 10%
Koyal, Hand	40% to 10%
Taintor Positive	40% to 10%
Shaving—	
Fox Shaving Sets, No. 30	40% to 10%
Smith & Hemenway Co.'s	60%
Sharpeners, Knife—	
Chicago Wheel & Mfg. Co.	70%
Pike Mfg. Co.:	
Fast Cut Pocket Knife Hones	40% to 10%
Mounted Kitchen Sand Stone	\$1.50
Natural Grit Carving Knife Hones	40% to 10%
Quick Cut Emery Carving Knife Hones	40% to 10%
Quick Edge Pocket Knife Hones	40% to 10%
Smith & Hemenway Co., Eureka	20%
Shaves, Spoke—	
Iron	doz. \$1.10 to \$1.25
Wood	doz. \$1.75 to \$2.25
Bailey's (Stanley R. & L. Co.)	45%
Razor Edge (Stanley R. & L. Co.)	55%
Iron, 50%: Wood	55%
Chapin-Stephens Co.	30% to 30%
Goodell's	40% to 10%
Wood's F1 and F2	50%
Shears—	
Cast Iron	7 8 9 in.
Best	\$16.00 18.00 20.00 gro.
Good	\$13.00 15.00 17.00 gro.
Cheap	\$5.00 6.00 7.00 gro.
Straight Trimmers, &c.—	
Best quality Jap.	70% to 70% to 10%
Best quality Nickel	60% to 60% to 10%
Fair quality Jap.	80% to 80% to 10%
Fair quality Nickel	75% to 75% to 10%
Tailors' Shears	40% to 40% to 10%
Acme Cast Shears	40% to 40% to 10%
Wilkinson Shear & Cutlery Co.:	
Sheep, 1900 list	30% to 10% to 5%
Grass	50% to 10%
Horse or Mule	50% to 10%
Tinners' Snips—	
Steel Blades	20% to 20% to 10%
Steel Laid Blades	40% to 10% to 50%
Forged Handles, Steel Blades, Berlin	50%
Heinrich's Snips	40%
Jennings & Griffin Mfg. Co.'s	64% to 40%
Niagara Snips	33% to 33% to 10%
P. S. & W. Forged Handles	25%
W. R. W.	40% to 10%
Pruning Shears—	
Cronk's Hand Shears	33% to 33%
Cronk's Wood Handle Shears	33% to 33%
Disston's Combined Pruning Hook and Saw	40% to 10%
Disston's Pruning Hook only	40% to 10%
John T. Henry Mfg. Co.:	
Pruning Shears, all grades	40% to 10%
P. S. & W. Co.	40% to 10%
Wilkinson Shear & Cutlery Co.:	
Hed-e, Wilcut Brand	60% to 10%

Lawn and Border, Wilcut Brand	60% to 10%
Sheaves—Sliding Door—	
Stowell's Anti-Friction	50%
Reading list	40%
R. & E. list	15%
Wrightsville Hatfield Pattern	87% to 10%
Sliding Shutter—	
Reading list	40%
R. & E. list	10%
Shells—Shells, Empty—	
Brass Shells, Empty:	
Climax, 10 and 12 gauge	65% to 10%
Club, Rival, 65% to 10%	60% to 5%
Paper Shells, Empty:	
New Rapid, 10, 12, 16 and 20 gauge	25% to 10%
Climax, 10 and 12 gauge: Acme, 10, 12, 16 and 20 gauge: Ideal, 10, 12, 16 and 20 gauge: Leader grade	25% to 5%
Union, League, 12 and 12 gauge	25% to 5%
Rival Grade	25%
New Climax, Defiance, 10, 12, 14, 16 and 20 gauge: Climax, 14, 16 and 20 gauge: League, Union, 14, 16 and 20 gauge: Repeater Grade	20% to 5%
Expert, 10, 12, 16 and 20 gauge	33% to 5%
Robin Hood, Low Brass	20% to 5%
Robin Hood, High Brass	30% to 5%
Indian, for Black Powder	25% to 5%
Shells, Loaded—	
Loaded with Black Powder	40%
Loaded with Smokeless Powder, medium grade	40% to 5%
Loaded with Smokeless Powder, high grade	40% to 10% to 10%
Robin Hood:	
Smokeless Robin Hood, Low Brass	40% to 10%
Smokeless Comets, High Brass	40% to 10% to 5%
Indian, Black Powder	40% to 5%
Union Metallic Cartridge Co.:	
New Club, Black Powders	40%
Nitro Club, Smokeless Powders	40% to 5%
Arrow, Smokeless Powders	40% to 10%
Winchester:	
Smokeless Repeater Grade	40% to 5%
Smokeless Leader Grade	40% to 10% to 10%
Black Powder	40%
Shingles, Metal—Per Sq.	
Edwards Mfg. Co.:	
14 x 20	\$1.25 \$6.00
10 x 14	4.50 6.25
7 x 10	4.75 6.50
Wheeling Corrugating Co.:	
Dixie, 14 x 20 in.	\$1.25 \$5.50
Dixie, 10 x 14 in.	4.50 6.00
Dixie, 7 x 10 in.	5.00 6.75
Shoes, Horse, Mule, &c.—	
F.o.b. Pittsburgh:	
Iron	per keg \$4.10
Steel	per keg \$3.85
Burden's, all sizes	per keg \$3.90
Shot—	
Drop, up to B	25-lb. bag \$1.95
Drop, B and larger	2.20
Buck	2.20
Chilled	2.20
Dust	2.40
Shovels and Spades—	
Association List, Nov. 15, 1902	40%
Avery Stamping Co.	40%
Snow Shovels—	
Long Handle	\$2.75 to \$3.00
Wood and Mall. D. Handle	\$3.25 to \$3.50
Sieves and Sifters—	
Hunter's Imitation	gro. \$9.50 to \$10.00
Hunter's Genuine	per gro. \$12.00 to \$12.50
Buffalo Metallic Sifters, R. M. Co.	40%
14x16	16x18 18x20
\$13.20	\$13.50 \$14.40
Sieves, Seamless Metallic—	
Per dozen	
Mesh	14 16 18 20
Iron Wire	\$1.05 1.05 1.10 1.20
Tinned Wire	\$1.15 1.15 1.20 1.30
Sieves, Wooden Rim—	
Nested, 10, 11 and 12 in.	
Mesh 18, Nested	doz. \$0.90 to \$0.95
Mesh 20, Nested	doz. \$1.00 to \$1.05
Mesh 24, Nested	doz. \$1.30 to \$1.40
Sinks, Cast Iron—	
Painted, Standard list:	
12 x 12 to 22 x 36 in.	60%
20 x 40 to 24 x 50 in.	50%
24 x 60 to 24 x 120 in.	30%
Barnes' list:	
Up to and including 20 x 36 in.	50%
20 x 40 to 24 x 50 in.	45%
NOTE—There is not entire uniformity in lists used by jobbers.	
Skis, Wagon—	
Cast Iron	70% to 75% to 10%
Steel	40% to 45%
Slates, School—	
"D" Slates	50% to 50% to 10%
Eureka, Unexcelled Noiseless	60% to 10%
Victor A. Noiseless	60% to 10% to 5%
Slaw Cutters—See Cutters.	
Snaps, Harness—	
German	40% to 40% to 10%
Covert Mfg. Co.:	
Derby, 25%: Yankee, 30% to 25%: Yankee Roller, 30% to 25%	
High Grade, 40%: Trojan	40%
Jockey	25%
Oneida Community:	
Harness Snaps, 1 inch	60% to 5%
Swivel Snaps	60%
Swivels	50%
Snaths—	
Scythe	50%
Snips, Tinners—See Shears.	

Spoons and Forks—	
Silver Plated—	
Good Quality	50% to 10% to 65%
Cheap	60% to 60% to 10%
International Silver Co.:	
1847 Rogers Bros., 40% to 10%: Rogers & Hamilton	50% to 10%
Rogers & Bro., William Rogers	50% to 10%
Eagle Brand	50% to 10%
Anchor, Rogers Brand	60%
Wm. Rogers & Son	60% to 10%
Miscellaneous—	
German Silver	60% to 60% to 5%
Cattaraugus Cutlery Co.:	
Seneca Silver	50%
Tinned Iron—	
Teas	per gro. \$5 to \$5.50
Tables	per gro. \$0.50 to \$1.00
Springs—Door—	
Bardsley's Spring and Check	40%
Chicago (Coil)	40% to 10%
Gem (Coil)	20%
Pullman (Coil)	35%
Reliance (Coil)	40% to 10%
Star (Coil)	30%
Torrey's Rod, 3/8 in.	40% to 10%
Carriage, Wagon, &c.—	
1 1/4 in. and wider	per 100 lb.
Black	\$1.75 to \$5.00
Half Bright	\$1.75 to \$5.00
Bright	\$5.25 to \$5.50
Painted Seat Springs:	
1 1/2 x 2 x 26	per pr. \$7 to \$9
1 1/2 x 3 x 28	per pr. \$9 to \$11
Sprinklers, Lawn—	
Enterprise	25% to 30%
Philadelphia No. 1	40% to 10% to 10%
2, \$15; No. 3, \$20	30%
Am. Foundry & Mfg. Co.:	
Cactus	65%
Japanese	70%
National	\$12.00
Squares—	
Nickel plated	List Jan. 5, 1900.
Steel and Iron	75% to 10%
Rosewood Hdl. Try Square and T-Bevels	60% to 10% to 70%
Iron Hdl. Try Squares and T-Bevels	40% to 10% to 10%
Disston's Try Squares and Bev.	60% to 10%
Rosewood Handle, 60% to 10%: Iron Stock and Bevel	15%
Winterbottom's Try and Miter, No. 1, 35%; No. 2	45%
Squeezers, Lemon	
Wood, Common, gro., No. 0, \$5.25 to \$5.50; No. 1, \$6.25 to \$6.50	
Wood, Porcelain Lined:	
Cheap	doz. \$1.00
Good Grade	doz. \$1.25
Tinned Iron	doz. \$0.75 to \$1.25
Iron, Porcelain Lined	doz. \$1.75
Staples—	
Barbed Blind	lb. 60% to 65%
Electricians', Association list	80% to 10% to 10%
Fence Staples, Plain, \$2.25; Galvanized	\$7.55
Poultry Netting Staples	per lb. 3 1/4 to 3 1/2
Steels, Butchers—	
Dick's	30%
Forster Bros.	30%
C. & A. Hoffmann's	30%
Steelyards—	
30% to 30% to 10%	
Stocks and Dies—	
Blacksmiths'	50% to 50% to 10%
Curtis Rev'ble Ketcher Die Stock	25%
Derby Screw Plates	25%
Green River	25%
Lightning Screw Plate	25%
Little Giant	25%
Reese's New Screw Plates	25%
Stoners, Cherry—	
Enterprise	25% to 30%
Stones—Oil, &c.	
Chicago Wheel & Mfg. Co., 1901 list:	

Electro (Artificial), $\frac{1}{2}$ doz. \$12.00
Lightning (Artificial), $\frac{1}{2}$ doz. \$18.00

Stoppers, Bottle—

Victor Bottle Stoppers..... $\frac{1}{2}$ doz. \$9.00

Stops—Bench—

Millers Falls..... $\frac{1}{2}$ doz. \$15.10
Morrill's, $\frac{1}{2}$ doz., No. 1, \$10.00
Morrill's, No. 2, \$12.50

Door—

Chapin-Stephens Co..... $\frac{1}{2}$ doz. \$60.00

Plane—

Chapin-Stephens Co..... $\frac{1}{2}$ doz. \$20.00

Straps—Box—

Cary's Universal, case lots..... $\frac{1}{2}$ doz. \$20.00

Stretchers, Carpet—

Cast Iron, Steel Points, doz. \$60.00

Socket—

Bullard, $\frac{1}{2}$ doz..... $\frac{1}{2}$ doz. \$1.00

Excelsior Stretcher and Tack Hammer Combined, $\frac{1}{2}$ doz. \$6.00

Woven Fence—

Franklin.....ea. \$3.75

Strops, Razor—

Star Diagonal Strop..... $\frac{1}{2}$ doz. \$25.00

Stuffers, Sausage—

Enterprise Mfg. Co..... $\frac{1}{2}$ doz. \$25.00

National Specialty Co., list Jan. 1, 1902..... $\frac{1}{2}$ doz. \$30.00

P. S. & W. Co..... $\frac{1}{2}$ doz. \$10.00

Sweepers, Carpet—

Bissell Carpet Sweeper Co., $\frac{1}{2}$ doz. \$36.00

Superba, Crotch Mahogany..... $\frac{1}{2}$ doz. \$33.00

Triumph, Fancy Veneers..... $\frac{1}{2}$ doz. \$30.00

Parlor Queen, Figured Rosewood..... $\frac{1}{2}$ doz. \$29.00

Elite, Hungarian Ash..... $\frac{1}{2}$ doz. \$29.00

American Queen, Figured Mahogany..... $\frac{1}{2}$ doz. \$27.00

Ideal, Bird's-Eye Maple..... $\frac{1}{2}$ doz. \$25.00

Grand Rapids, Nickel..... $\frac{1}{2}$ doz. \$22.00

Japan..... $\frac{1}{2}$ doz. \$22.00

Standard, Nickel, \$22.00; Japan, \$20.00

Crown Jewel, Nickel, \$21.00; Japan, \$19.00

Crystal, Glass Top..... $\frac{1}{2}$ doz. \$36.00

Grand, 17 in. wide..... $\frac{1}{2}$ doz. \$36.00

Cub, 24 in. wide..... $\frac{1}{2}$ doz. \$34.00

Hall, 28 in. wide..... $\frac{1}{2}$ doz. \$30.00

National Sweeper Co., $\frac{1}{2}$ doz. \$12.00

Plaid XV, Roller Bearing, Gold Plated..... $\frac{1}{2}$ doz. \$12.00

Hepplewhite, Roller Bearing, Silver Plated..... $\frac{1}{2}$ doz. \$12.00

Sheraton, Roller Bearing, N'kel \$40.00

Ye Mission, Roller Bearing, Oxidized Copper..... $\frac{1}{2}$ doz. \$36.00

Transparent, Roller Bearing, Plate Glass Top, Nickel..... $\frac{1}{2}$ doz. \$36.00

National Queen, Roller Bearing, Fancy Veneers..... $\frac{1}{2}$ doz. \$27.00

Loyal, Roller Bearing, Veneers, Nickel..... $\frac{1}{2}$ doz. \$25.00

Triple Medal, Roller Bearing, Nickel..... $\frac{1}{2}$ doz. \$24.00

Marion, Roller Bearing, N'kel \$24.00

Marion Queen, Roller Bearing, Nickel..... $\frac{1}{2}$ doz. \$24.00

Monarch, Roller Bearing, N'kel \$22.00

Perpetual, Regular B'r's, Jap. \$20.00

Perpetual, Regular B'r's, Jap. \$18.00

Monarch Extra (17 in. case), Roller Bearing, Nickel..... $\frac{1}{2}$ doz. \$36.00

Monarch Extra (17 in. case), Roller Bearing, Japan..... $\frac{1}{2}$ doz. \$33.00

Auditorium (26 in. case), Roller Bearing, Nickel..... $\frac{1}{2}$ doz. \$54.00

Mammoth (30 in. case), Roller Bearing, Nickel..... $\frac{1}{2}$ doz. \$60.00

Streator Metal Stamping Co., Eureka Japanned..... $\frac{1}{2}$ doz. \$15.00

Model A, Sanitaire..... $\frac{1}{2}$ doz. \$25.00

Model A, Sterling..... $\frac{1}{2}$ doz. \$25.00

Model B, Sterling, Nickel..... $\frac{1}{2}$ doz. \$25.00

Model B, Sterling, Japanned..... $\frac{1}{2}$ doz. \$21.00

Model C, Sterling..... $\frac{1}{2}$ doz. \$21.50

Model D, Sterling..... $\frac{1}{2}$ doz. \$19.50

NOTE—Rebates: 50¢ per dozen on three dozen lots; \$1 per dozen on five dozen lots; \$2 per dozen on ten dozen lots; \$2.50 per dozen on twenty-five dozen lots.

Tacks, Finishing Nails, &c.

New List, May 1, 1905.

American Carpet Tacks..... $\frac{1}{2}$ doz. \$9.00

American Cut Tacks..... $\frac{1}{2}$ doz. \$9.00

Sveeds' Cut Tacks..... $\frac{1}{2}$ doz. \$9.00

Sveeds' Upholsterers..... $\frac{1}{2}$ doz. \$9.00

Lace Tacks..... $\frac{1}{2}$ doz. \$9.00

Trimmers' Tacks..... $\frac{1}{2}$ doz. \$9.00

Looking Glass Tacks..... $\frac{1}{2}$ doz. \$9.00

Bill Posters' and Railroad Tacks..... $\frac{1}{2}$ doz. \$9.00

Hungarian Nails..... $\frac{1}{2}$ doz. \$9.00

Finishing Nails..... $\frac{1}{2}$ doz. \$9.00

Trunk and Clout Nails..... $\frac{1}{2}$ doz. \$9.00

NOTE—The above prices are for Standard Weights.

Miscellaneous—

Double Pointed Tacks..... $\frac{1}{2}$ doz. \$9.00

See also Nails, Wire.

Tanks, Oil and Gasoline—

R. M. Co., Oil..... $\frac{1}{2}$ doz. \$3.00

Gal. Emerald..... $\frac{1}{2}$ doz. \$3.00

Gal. Queen City..... $\frac{1}{2}$ doz. \$3.00

Gal. \$1.25..... $\frac{1}{2}$ doz. \$3.00

Wilson & Friend Co., Gasoline..... $\frac{1}{2}$ doz. \$3.00

Tapes, Measuring—

American Asses' Skin..... $\frac{1}{2}$ doz. \$3.00

Kenuff & Esmer Co., Favorite, Ass Skin..... $\frac{1}{2}$ doz. \$3.00

Favorite, Duck and Leather..... $\frac{1}{2}$ doz. \$3.00

Metallic and Steel, lower list, \$3.00

5¢; Pocket, \$3.00

Lufkin's Asses' Skin..... $\frac{1}{2}$ doz. \$3.00

Metallic..... $\frac{1}{2}$ doz. \$3.00

Patent Bend, Leather..... $\frac{1}{2}$ doz. \$3.00

Pocket..... $\frac{1}{2}$ doz. \$3.00

Steel..... $\frac{1}{2}$ doz. \$3.00

Wiebusch & Hilger: Chesterman's Metallic, No. 34L..... $\frac{1}{2}$ doz. \$3.00

Chesterman's Steel, No. 10381..... $\frac{1}{2}$ doz. \$3.00

etc..... $\frac{1}{2}$ doz. \$3.00

Teeth, Harrow—

Steel Harrow Teeth, plain or headed, $\frac{1}{2}$ -inch and larger..... $\frac{1}{2}$ doz. \$2.75

per 100 lbs. \$2.75

Thermometers—

Tin Case..... $\frac{1}{2}$ doz. \$8.00

Ties, Bale—Steel Wire—

Single Loop..... $\frac{1}{2}$ doz. \$8.00

Monitor, Cross Head, etc. 70¢

Brick Ties—

Niagara Brick Ties..... $\frac{1}{2}$ doz. \$2.50

Tinners' Shears, &c.—

See Shears, Tinners', &c.

Tinware—

Stamped, Japanned and Pieced, sold very generally at net prices.

Tire Benders, Upsetters, &c.

See Benders and Upsetters, Tire.

Tools—Coopers'—

L. & I. J. White..... $\frac{1}{2}$ doz. \$20.00

Haying—

Myers' Hay Tools..... $\frac{1}{2}$ doz. \$45.00

Stowell's Hay Carriers, 50%; Hay Forks, 50%; Fork Pulleys, 50%.

Miniature—

Smith & Hemenway Co.'s, Davidson..... $\frac{1}{2}$ doz. \$25.00

Saw—

Atkins' Cross Cut Saw Tools..... $\frac{1}{2}$ doz. \$35.00

Simonds' Improved..... $\frac{1}{2}$ doz. \$35.00

Ship—

L. & I. J. White..... $\frac{1}{2}$ doz. \$25.00

Transom Lifters—

See Lifters, Transom.

Traps—Fly—

Balloon, Globe or Acme, doz. \$1.15

\$1.15; doz. \$11.50

Harper, Champion or Paragon, doz. \$1.25

\$1.25; doz. \$12.50

Game—

Imitation Oneida..... $\frac{1}{2}$ doz. \$70.00

Newhouse..... $\frac{1}{2}$ doz. \$70.00

Hawley & Norton..... $\frac{1}{2}$ doz. \$70.00

Victor..... $\frac{1}{2}$ doz. \$70.00

Oneida Community Jump..... $\frac{1}{2}$ doz. \$70.00

Mouse and Rat—

Mouse, Wood, Choker, doz. holes 12¢

Mouse, Round or Square Wire, doz. 85¢

Marty French Rat and Mouse Traps (Genuine):

No. 1, Rat, $\frac{1}{2}$ doz., \$13.25; case of 24 \$11.50

No. 3, Rat, $\frac{1}{2}$ doz., \$6.50; case of 50 \$7.75

No. 3½, Rat, $\frac{1}{2}$ doz., \$5.25; case of 50 \$6.75

No. 4, Mouse, $\frac{1}{2}$ doz., \$3.85; case of 150 \$3.00

No. 5, Mouse, $\frac{1}{2}$ doz., \$3.00; case of 150 \$2.25

Wood's E. I..... $\frac{1}{2}$ doz. \$50.00

Trowels—

Disston Brick and Pointing..... $\frac{1}{2}$ doz. \$25.00

Disston Plastering..... $\frac{1}{2}$ doz. \$25.00

Disston Standard Brand and Garden Trowels..... $\frac{1}{2}$ doz. \$30.00

Kohler's Steel Garden Trowels, $\frac{1}{2}$ doz., 5 in., \$4.80; 6 in., \$6.00.

Never-Break Steel Garden Trowels..... $\frac{1}{2}$ doz. \$6.00

Rose Brick and Plastering..... $\frac{1}{2}$ doz. \$6.00

Woodrough & McParlin, Plastering..... $\frac{1}{2}$ doz. \$25.00

Trucks, Warehouse, &c.—

B. & L. Block Co.: New York Pattern..... $\frac{1}{2}$ doz. \$50.00

Western Pattern..... $\frac{1}{2}$ doz. \$60.00

Handy Trucks..... $\frac{1}{2}$ doz. \$16.00

Grocery..... $\frac{1}{2}$ doz. \$15.00

Daily Store Trucks, Improved Pattern..... $\frac{1}{2}$ doz. \$18.00

McKinney Trucks, each, net \$10.00

Model Store Trucks..... $\frac{1}{2}$ doz. \$18.50

Tubs, Wash—

M'Fgr's list, price per gross.

No. 9 1 2 3

Galvanized, \$63 \$76 \$84 \$96 10¢

Galvanized Wash Tubs (R. M. Co.):

No. 1 2 3 10 20 30

Per doz., net \$5.70 6.30 7.20 6.60 7.20 8.10

Twine, Miscellaneous—

Flax Twine:

No. 9, $\frac{1}{4}$ and $\frac{1}{2}$ -lb. Balls, 23¢

No. 12, $\frac{1}{4}$ and $\frac{1}{2}$ -lb. Balls, 21¢

No. 18, $\frac{1}{4}$ and $\frac{1}{2}$ -lb. Balls, 18¢

No. 24, $\frac{1}{4}$ and $\frac{1}{2}$ -lb. Balls, 17¢

No. 36, $\frac{1}{4}$ and $\frac{1}{2}$ -lb. Balls, 16¢

Chalk Line, Cotton 14-lb. Balls, 28¢

Cotton Mops, 6, 9, 12 and 15 lb. to doz. \$11.00

Cotton Wrapping, 5 Balls to lb., according to quality..... $\frac{1}{2}$ doz. \$23.00

American 2-Ply Hemp, $\frac{1}{4}$ and $\frac{1}{2}$ -lb. Balls..... $\frac{1}{2}$ doz. \$14.00

American 3-Ply Hemp, 1-lb. Balls..... $\frac{1}{2}$ doz. \$16.00

India 2-Ply Hemp, $\frac{1}{4}$ and $\frac{1}{2}$ -lb. Balls (Spring Twine)..... $\frac{1}{2}$ doz. \$11.00

India 3-Ply Hemp, 1-lb. Balls..... $\frac{1}{2}$ doz. \$14.00

India 3-Ply Hemp, $\frac{1}{4}$ -lb. Balls..... $\frac{1}{2}$ doz. \$11.00

2, 3, 4 and 5-Ply Jute, $\frac{1}{4}$ -lb. Balls..... $\frac{1}{2}$ doz. \$13.00

Mason Line, Linen, $\frac{1}{4}$ -lb. Bls. 17¢

No. 26½ Mattress, $\frac{1}{4}$ and $\frac{1}{2}$ -lb. Balls, according to quality, 30¢

Wool, 3 to 6 ply....B 9¢; A 10¢

Vises—

Solid Box..... $\frac{1}{2}$ doz. \$50.00

Parallel—

Atthol Machine Co.: Simpson's Adjustable..... $\frac{1}{2}$ doz. \$40.00

Standard..... $\frac{1}{2}$ doz. \$40.00

Amateur..... $\frac{1}{2}$ doz. \$25.00

Columbian Hdw. Co..... $\frac{1}{2}$ doz. \$40.00

Emmert Universal: Pattern Makers' No. 1, \$15.00; No. 2, \$12.50.

Machinist and Tool Makers' No. 4A, \$12.50; No. 6A, \$10.00; No. 10A, \$22.50.

Tiger Machinists..... $\frac{1}{2}$ doz. \$50.00

Fisher & Norris Double Screw, net, each, Nos. 2, \$10.50; 3, \$16.00; 4, \$20.50; 5, \$27.00.

Fulton Mach. & Vise Co.: Reed, Swivel..... $\frac{1}{2}$ doz. \$25.00

THE IRON AGE

Published every Thursday Morning by David Williams Co., 14-16 Park Place, New York.

Vol. 79: No. 26.

New York, Thursday, June 27, 1907

\$5.00 a Year, including Postage.
Single Copies, 15 Cents.

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Compression Shaft Couplings
Manufactured by
Forster Pulley Works
CUBA, N. Y.

The American Mfg. Co.
Ropes and Twines
65 Wall Street, New York



THE BRISTOL COMPANY
Waterbury, Conn., U. S. A.
New York: 114 Liberty St.
Chicago: 753 Monadnock Bldg.
Bristol's Recording Instruments
For Pressure, Temperature and Electricity.
Simple, Accurate, Reliable.
All Ranges, Low Prices, and Guaranteed. Send for Catalog R.

SAMSON SPOT CORD
Also Linen and Italian Hemp Sash Cord

SAMSON CORDAGE WORKS, Boston, Mass.



TURNBUCKLES
Branch Office, 11 Broadway, New York.
Cleveland City Forge and Iron Co., - Cleveland, O.



DROP HAMMER
MERRILL BROS.
BROOKLYN, N. Y.

IRON ORES.
Pilling & Crane
Girard Building, Phila.
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Empire Bldg., New York.

There may be some substitute for

HIGH QUALITY

—but so far it has not been discovered.

See
AMERICAN SHEET & TIN PLATE COMPANY'S

Ad. on Page 16



IT FIRES FIVE SHOTS IN ONE SECOND AND CAN BE RELOADED IN ONE HALF SECOND

Remington
AUTOLOADING RIFLE

Big game hunters have need for a rapid fire rifle, "big enough for the biggest game." The new Remington Autoloader meets the requirements. It is extremely accurate and delivers 5 smashing knock-down blows in one second. Big game hunters have judged the Remington SUPERIOR .35, .32 and .30-30 Remington calibres.

Are you STOCKED? They SELL.

Remington Arms Company, - Ilion, N. Y.
Agency, 315 Broadway, New York City.

WATER TUBE BOILERS **The Babcock & Wilcox Co.**
See page 58 85 Liberty Street New York


THE LARGE AND STEADILY INCREASING DEMAND FOR

"THE CAPEWELL" HORSESHOE NAIL

Is attracting wide attention among HARDWARE DEALERS who appreciate the fact that a large demand results in QUICK SALES; quick sales in more frequent DIVIDENDS, and a higher annual RATE of INTEREST upon every dollar invested.

Made by

The Capewell Horse Nail Co., Hartford Conn.



JENKINS BROS. VALVES
STANDARD PATTERN.
Made of new steam metal of the best grade. Fitted with the Jenkins Disc, assuring an absolutely steam tight valve under all ordinary pressures. When fitted with a soft Jenkins Disc they are the most satisfactory valves that can be obtained for use on water, air or gas. All parts interchangeable. Every valve bearing the Trade Mark is guaranteed.

JENKINS BROS., New York, Boston, Philadelphia, Chicago, London.

"Swedoh" Cold Rolled Steel is unexcelled for Drawing and Stamping
THE AMERICAN TUBE & STAMPING COMPANY
Water and Rail Delivery) BRIDGEPORT, CONN. SEE PAGE 22



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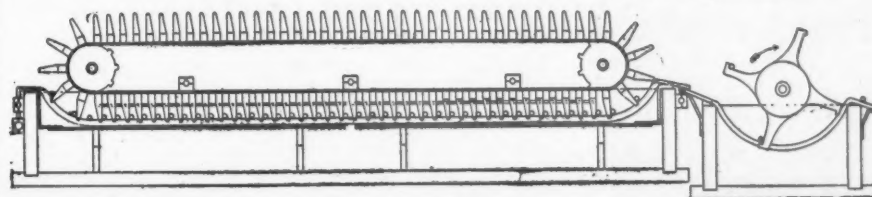
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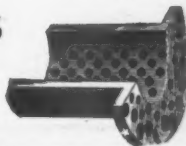
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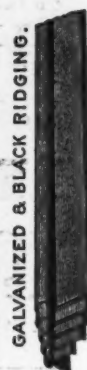
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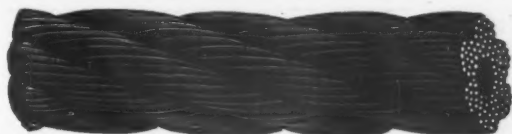
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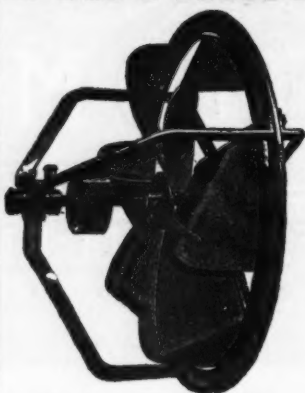
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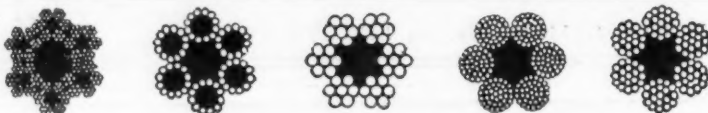
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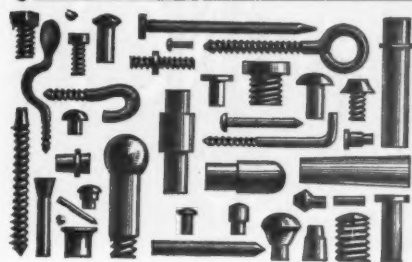
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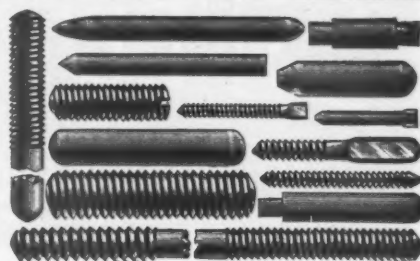
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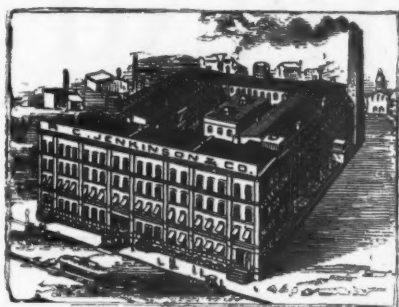
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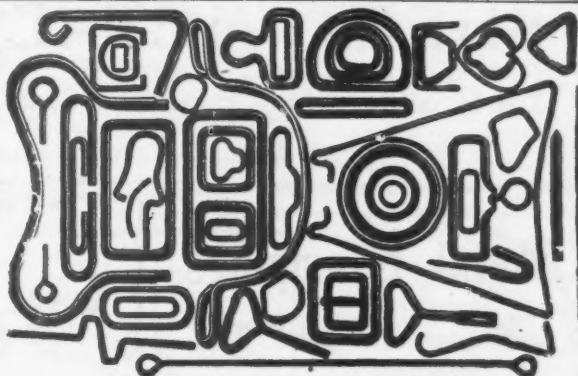


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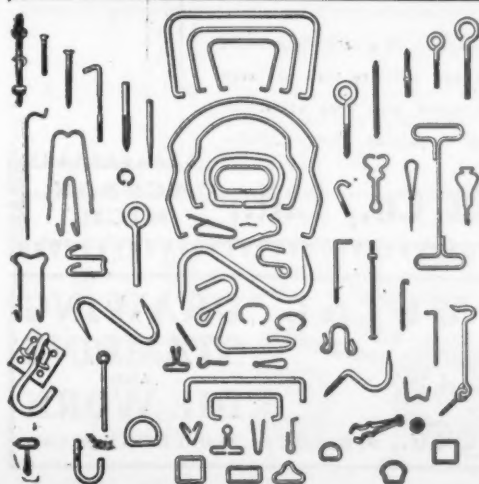
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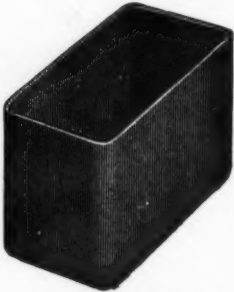
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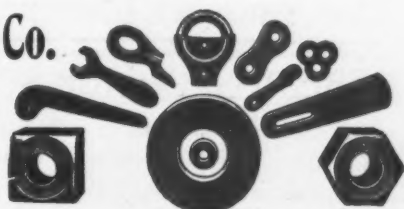
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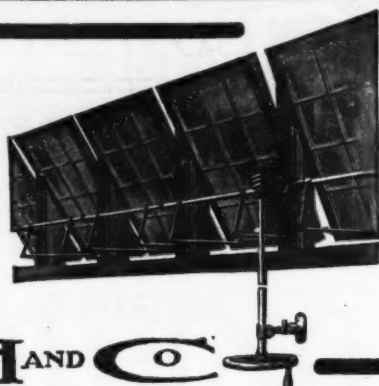
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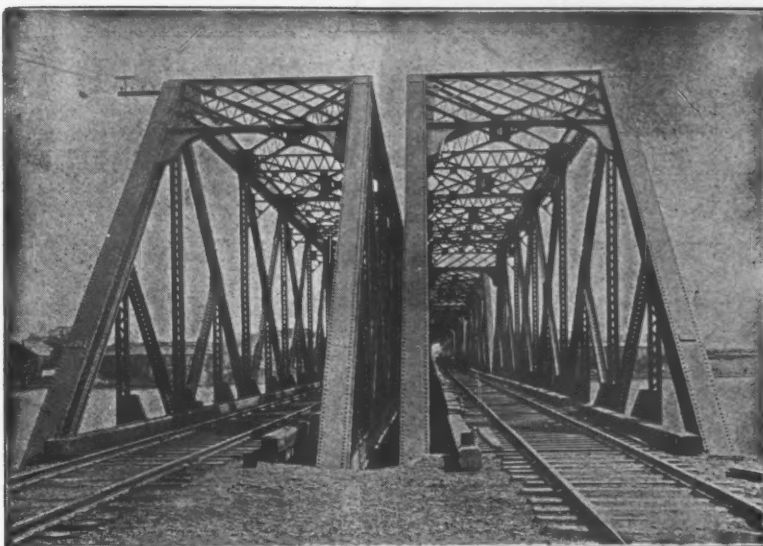
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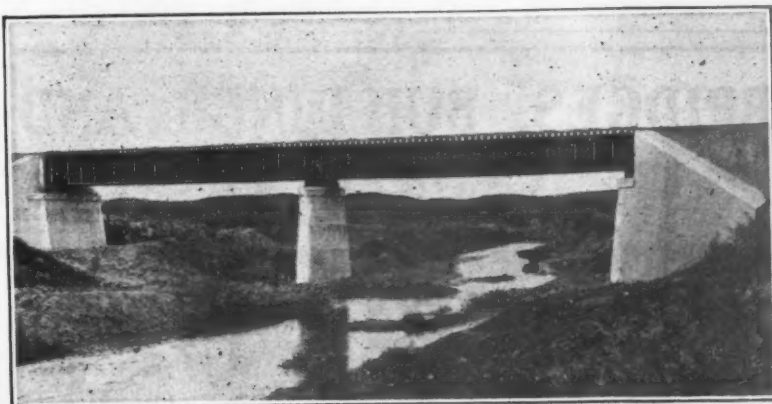
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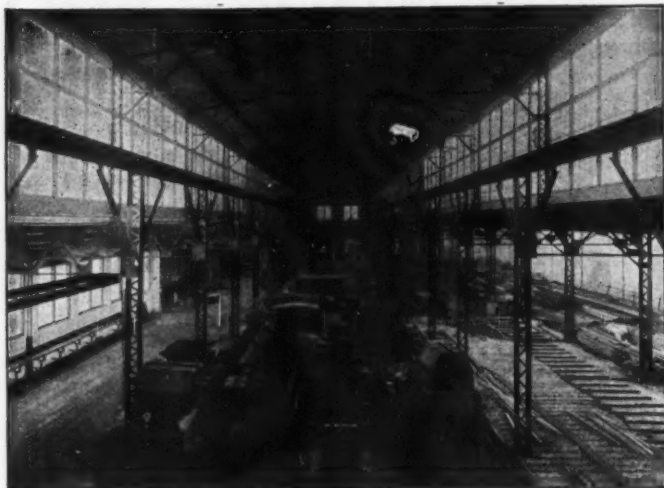
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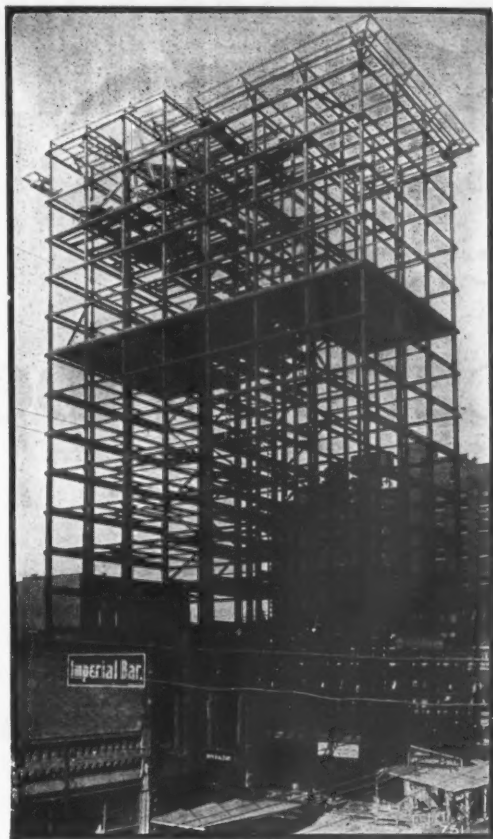
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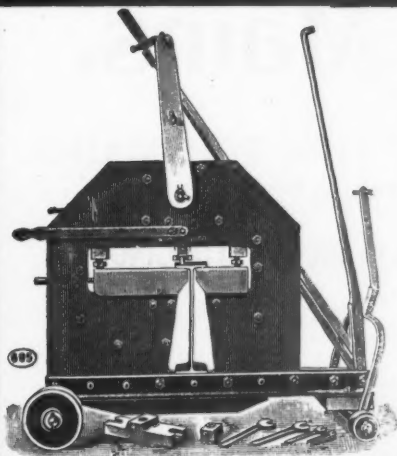
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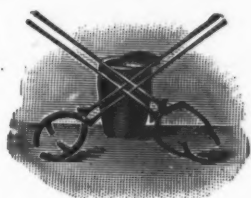
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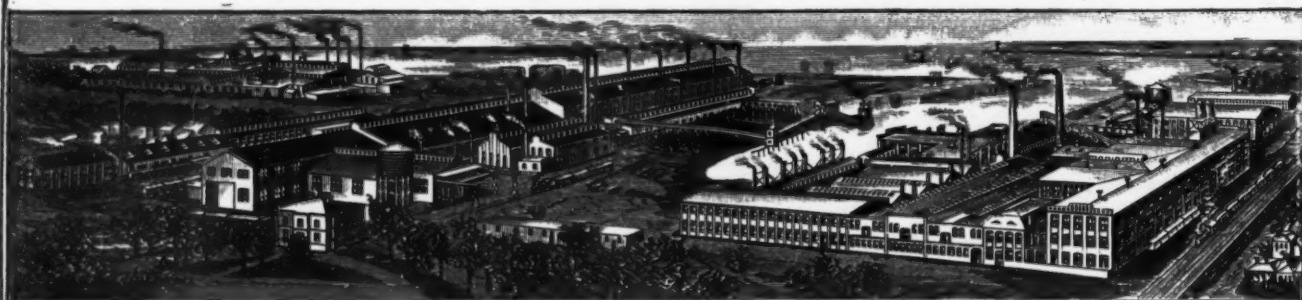
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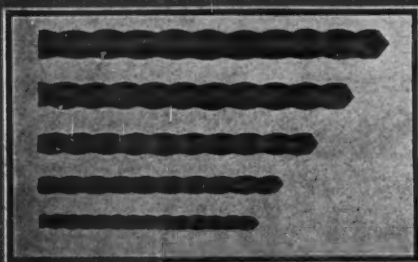
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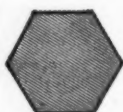
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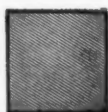
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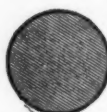
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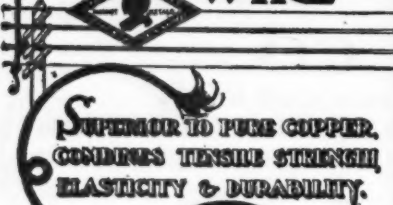
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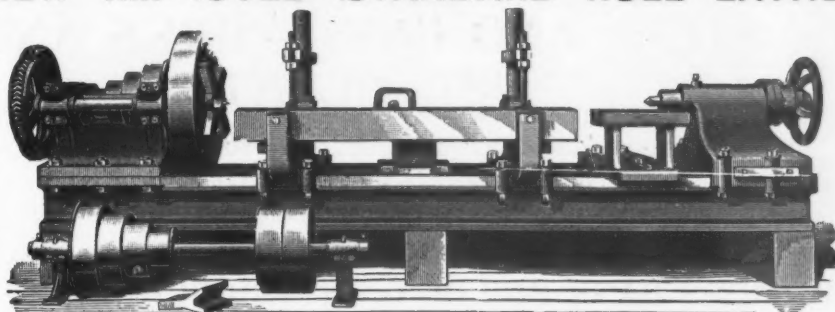
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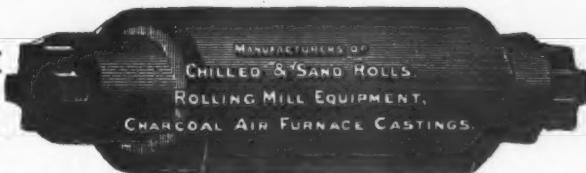
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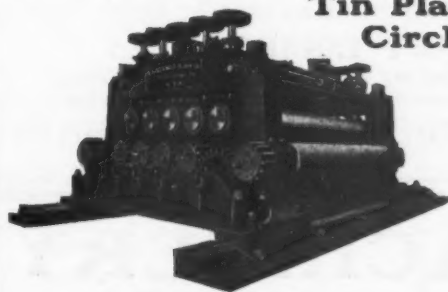


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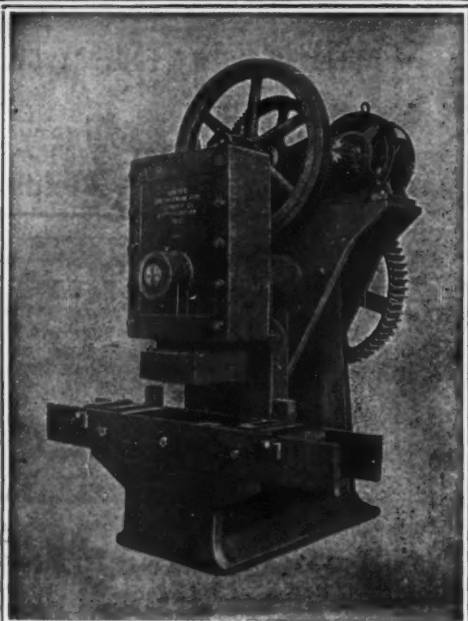
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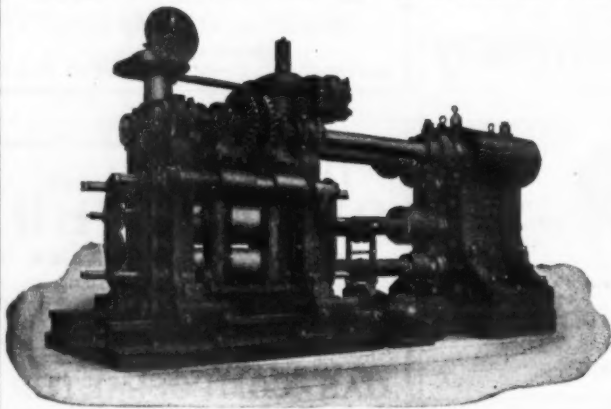
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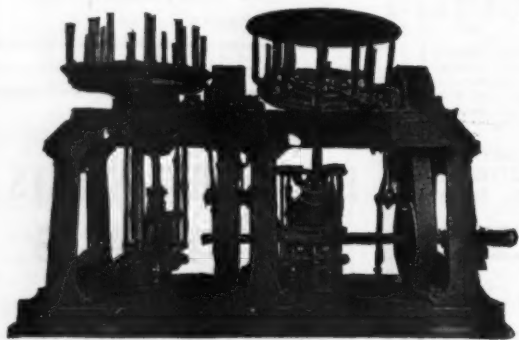
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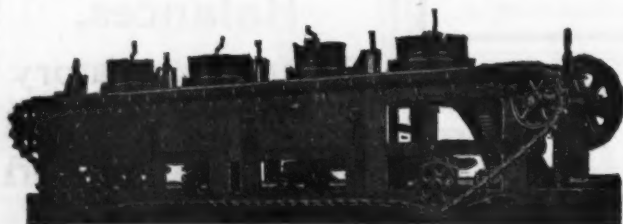
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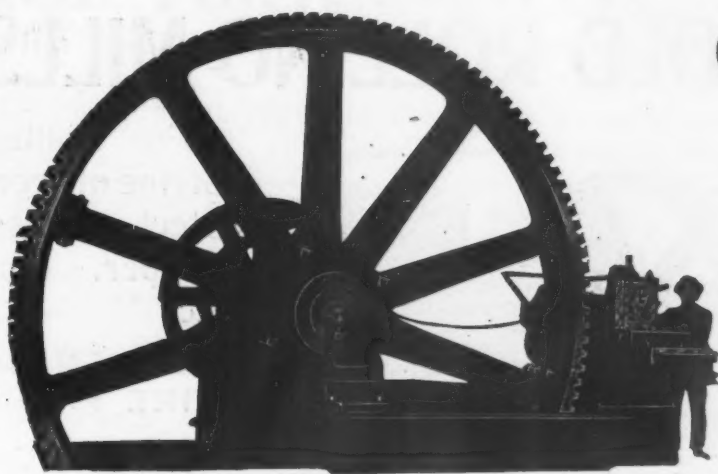
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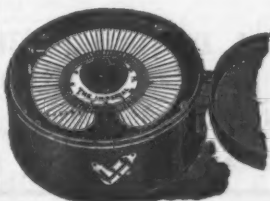
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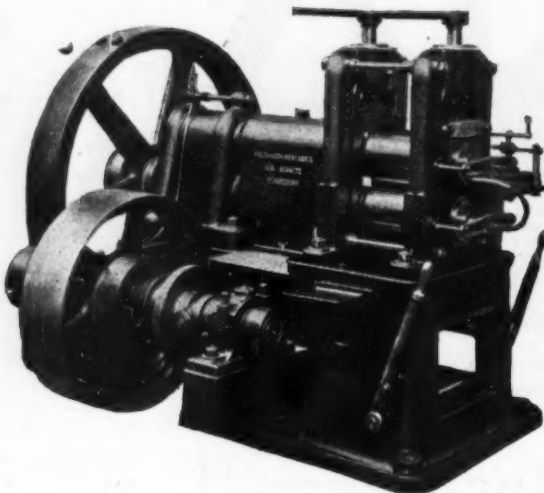
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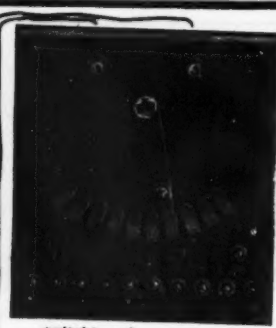
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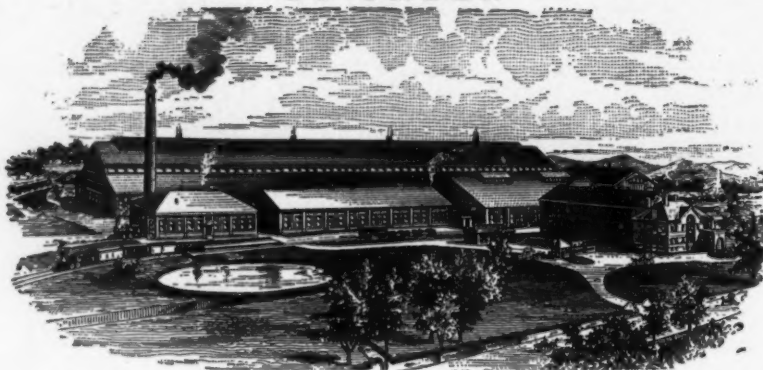
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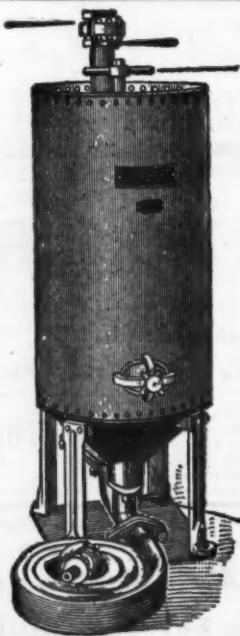
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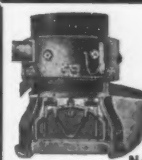
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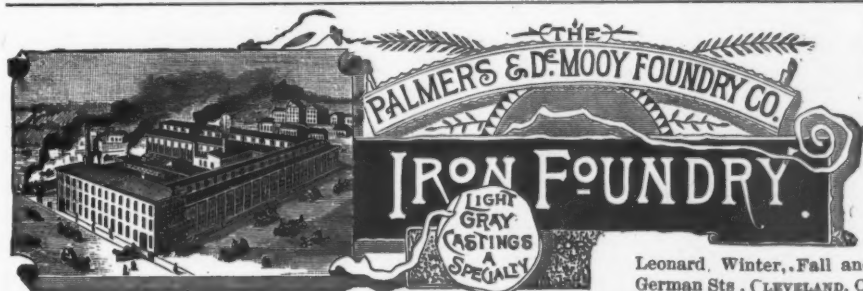
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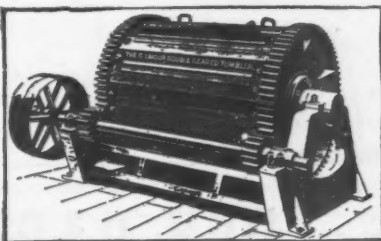


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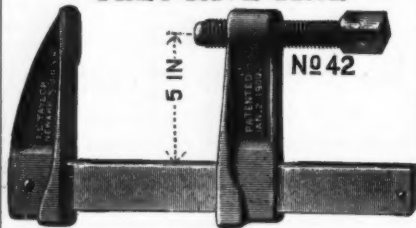
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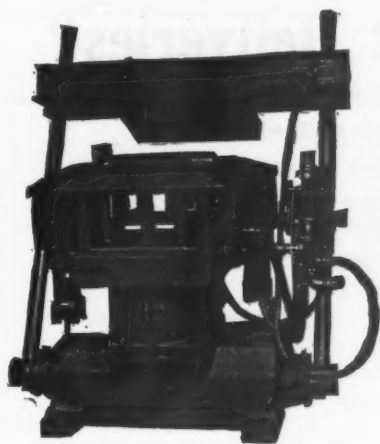
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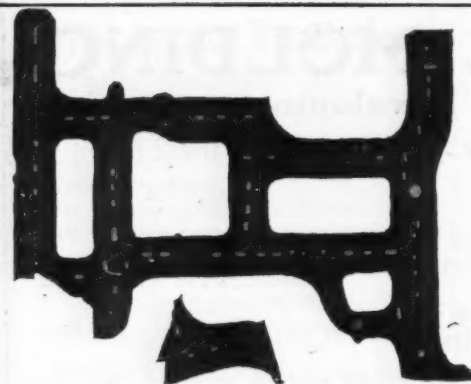
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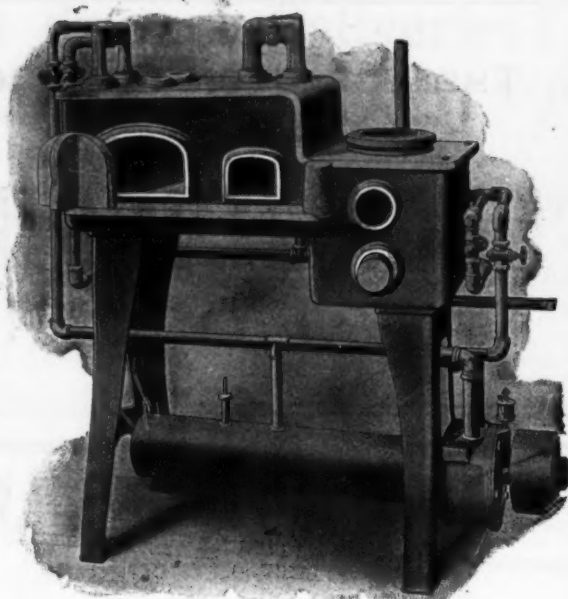
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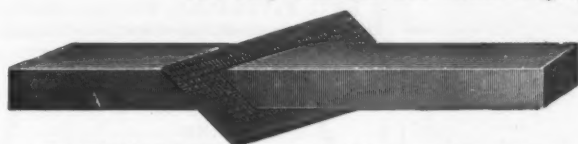
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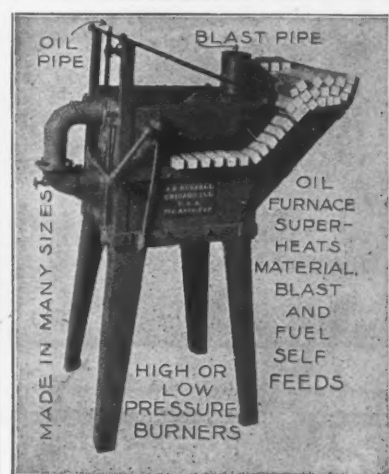
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
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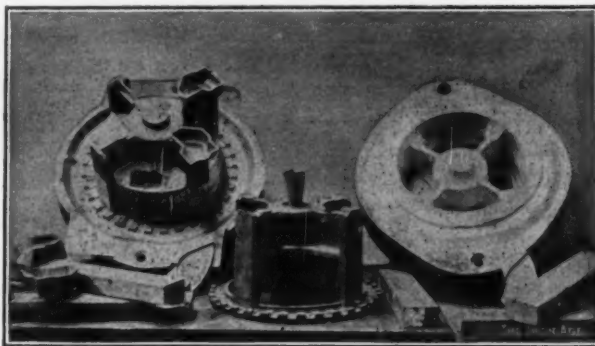
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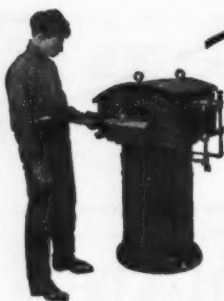
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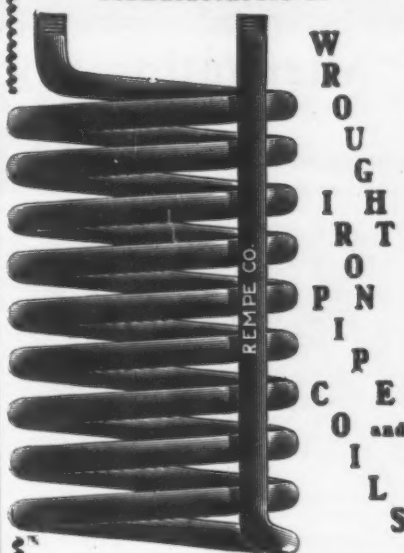
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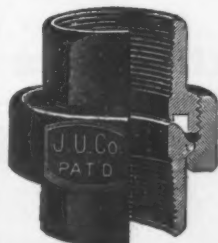


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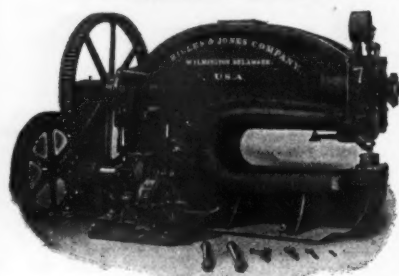
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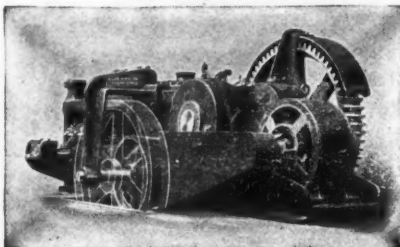
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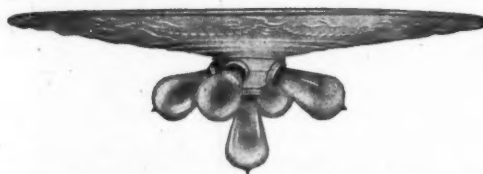
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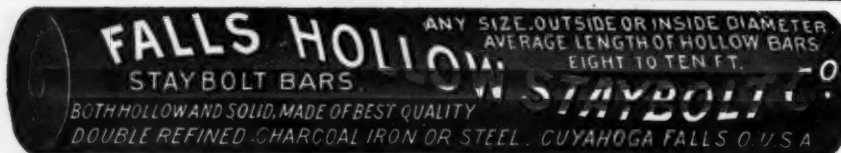
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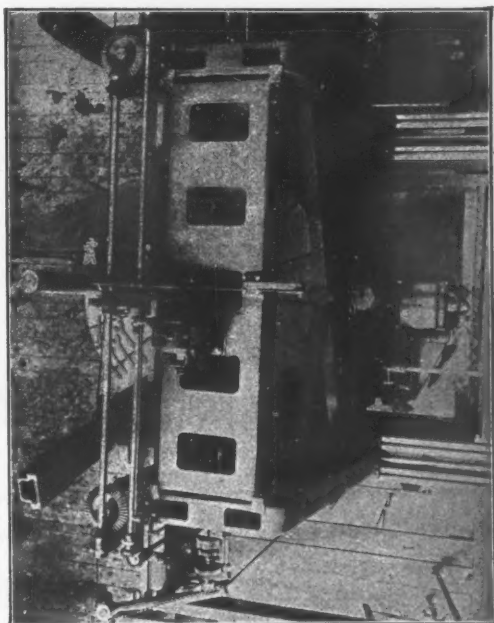
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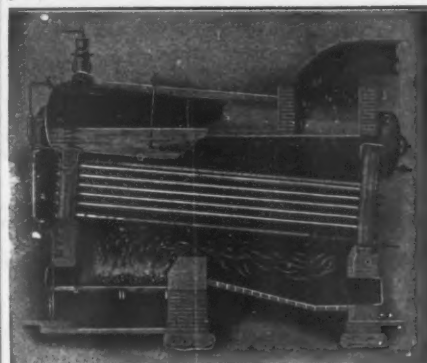
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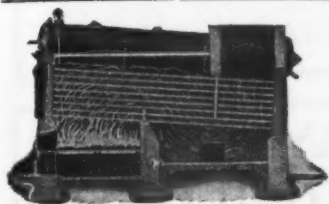
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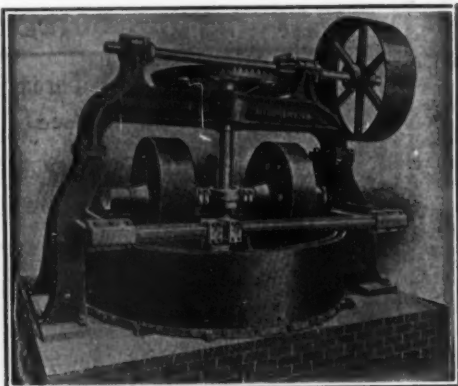
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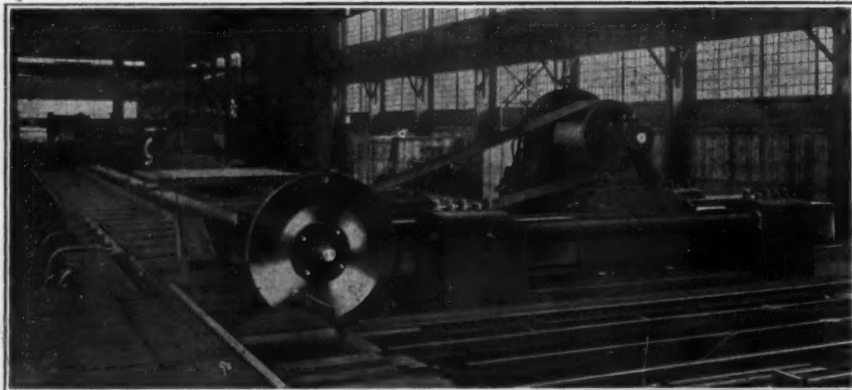
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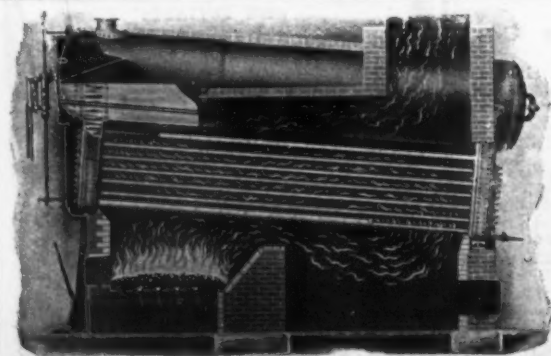
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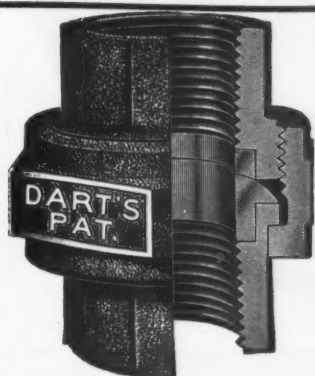
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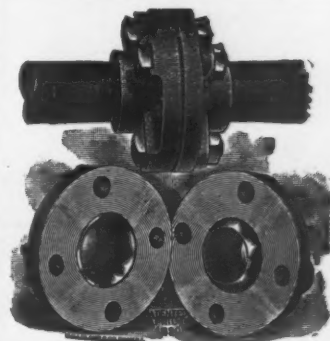


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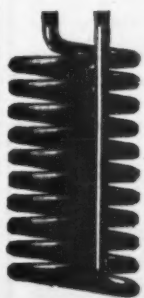
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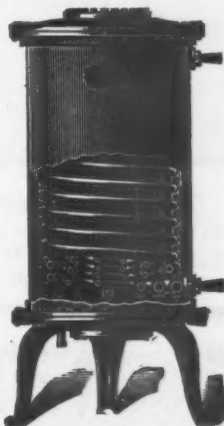


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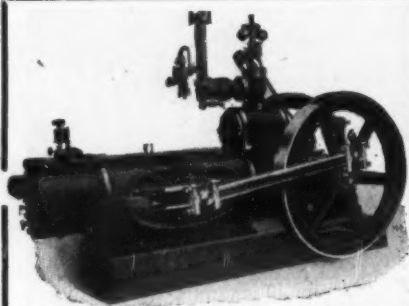


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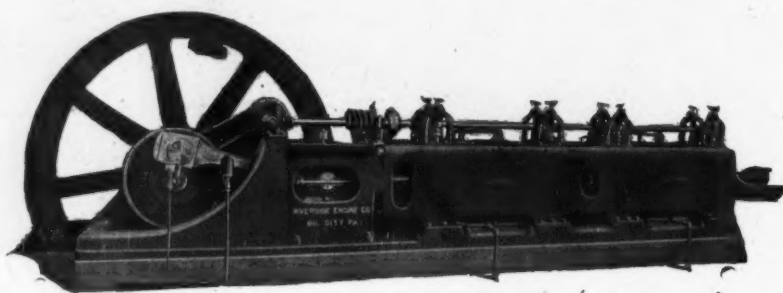


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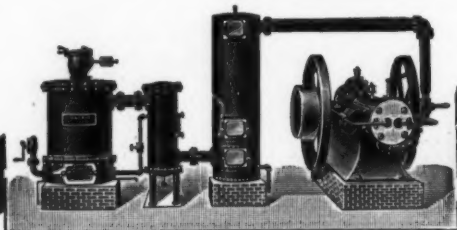
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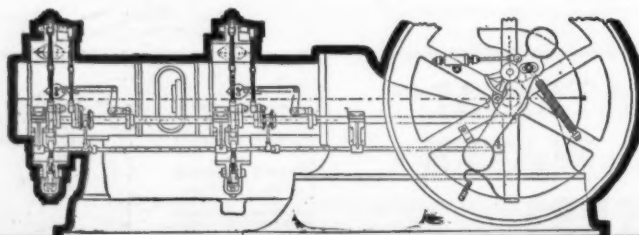
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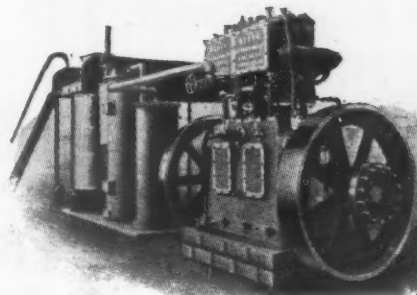
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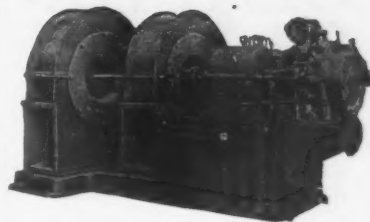
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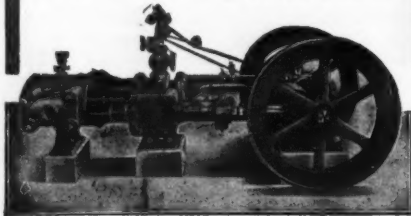
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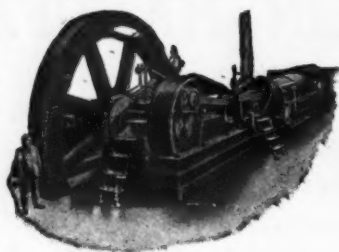
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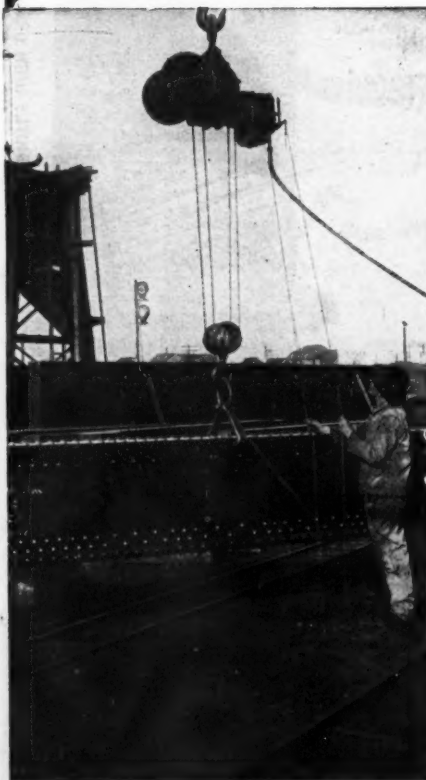
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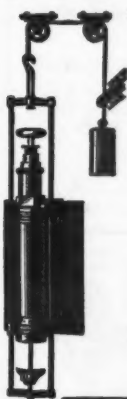
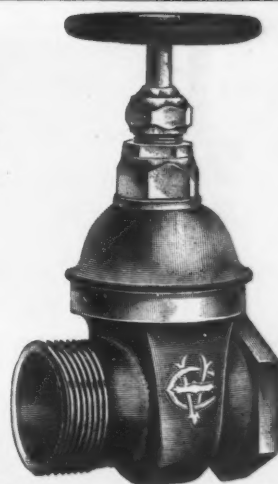
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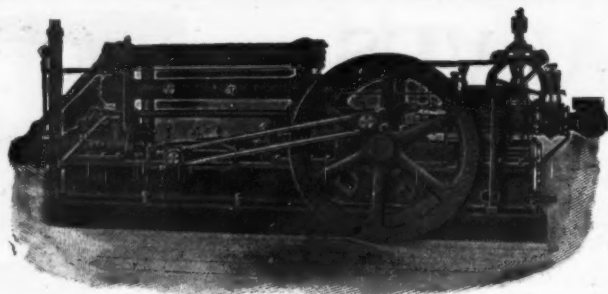
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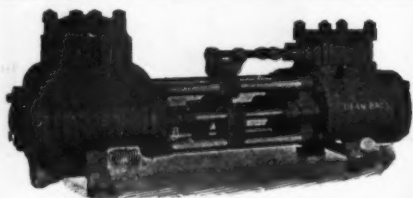
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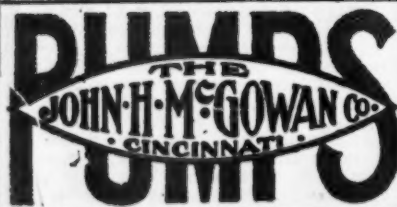
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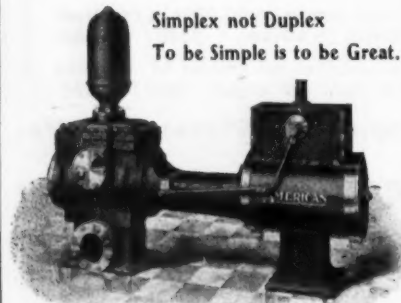
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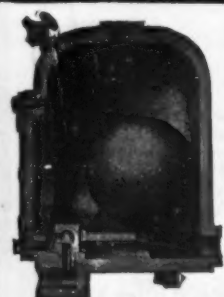


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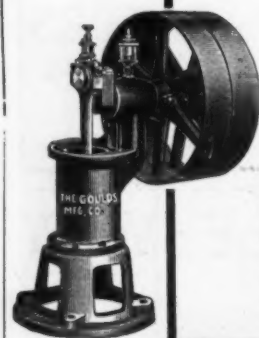
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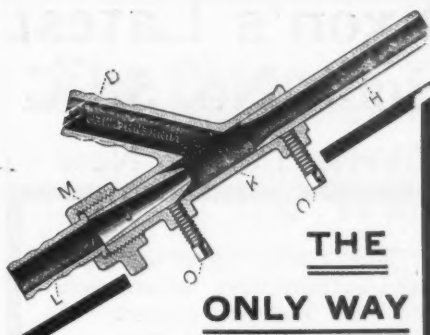
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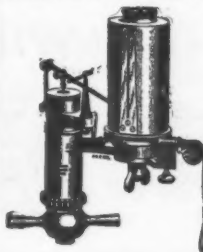


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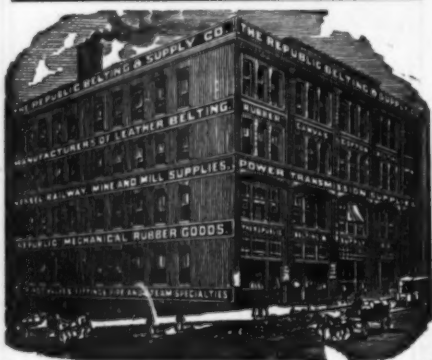
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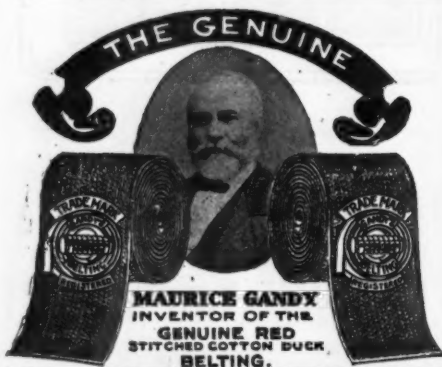
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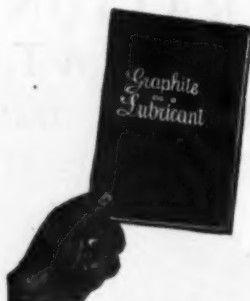
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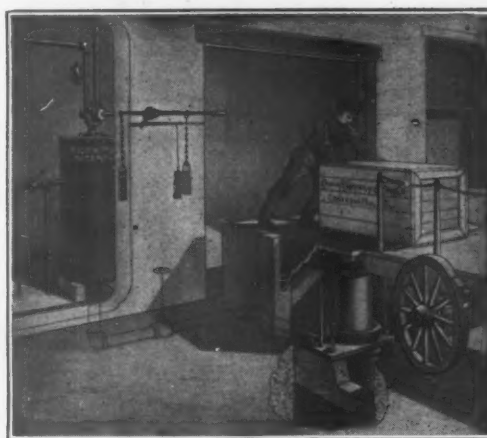
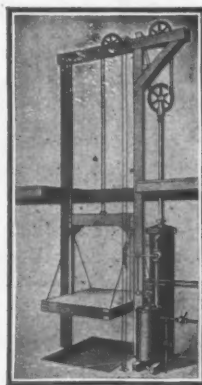
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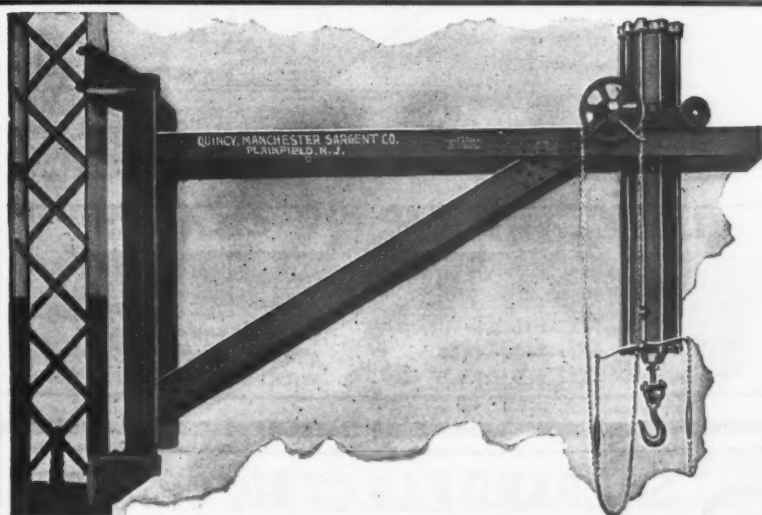
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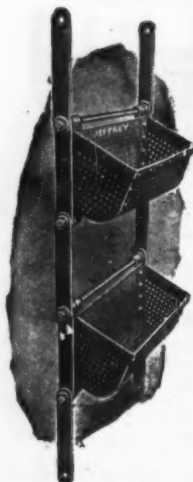
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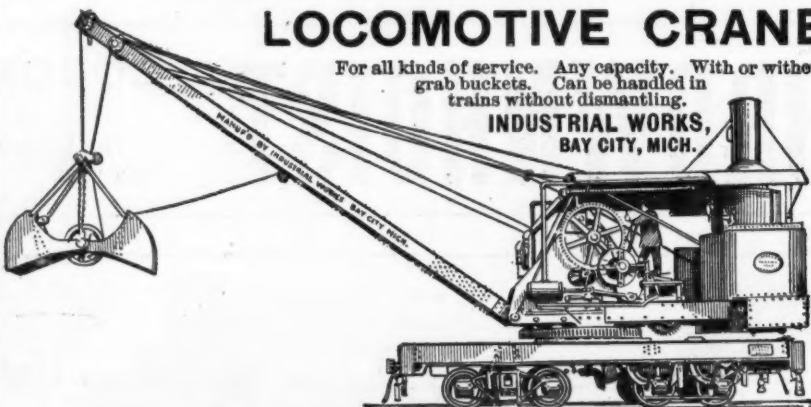
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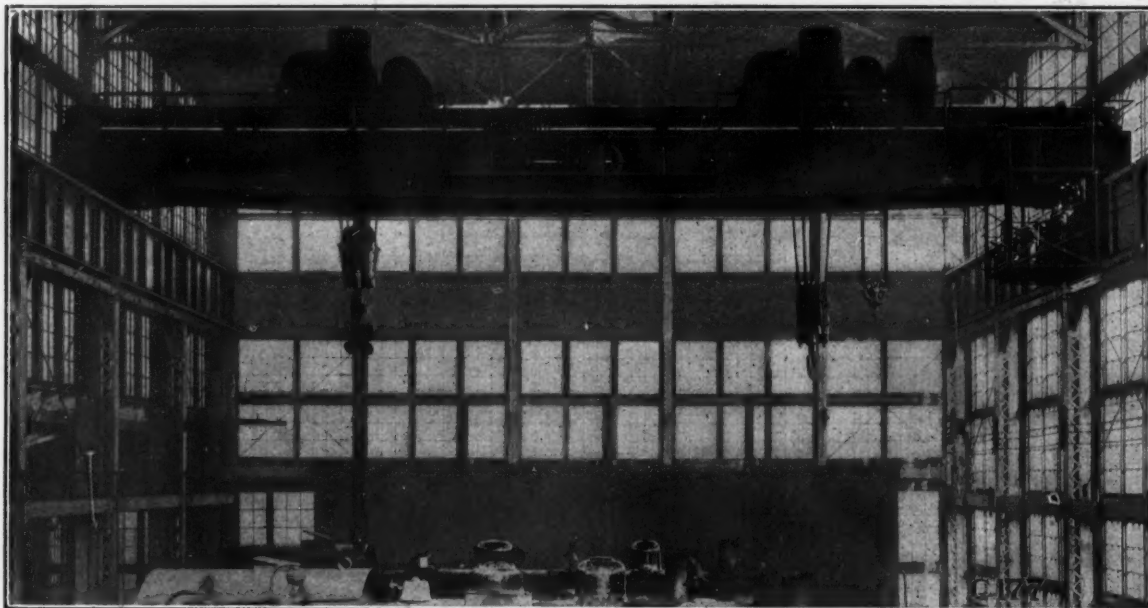
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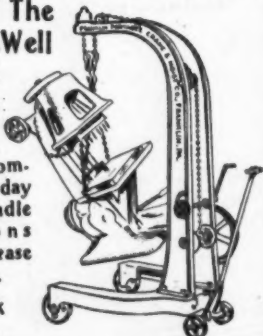
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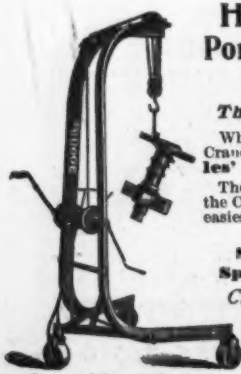
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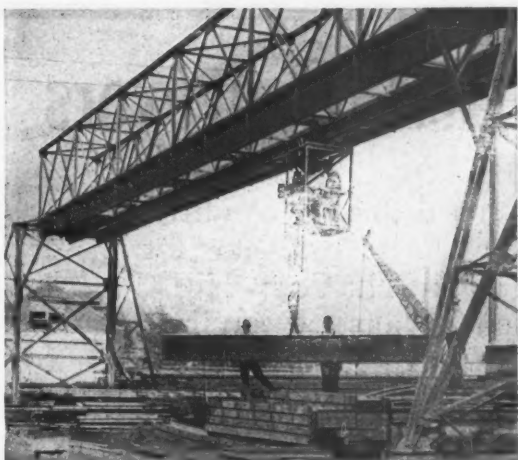
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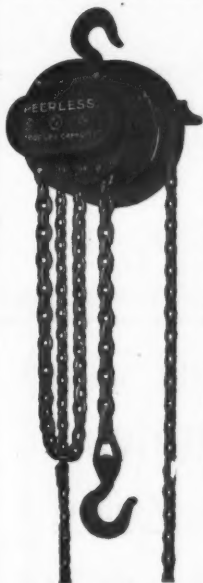
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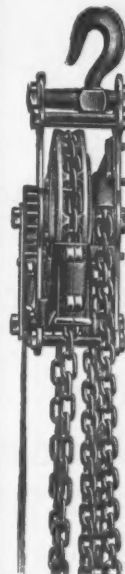
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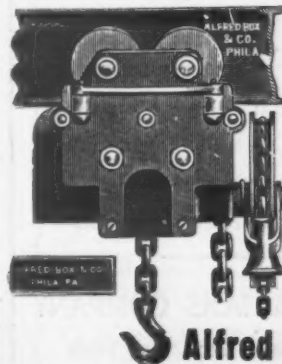
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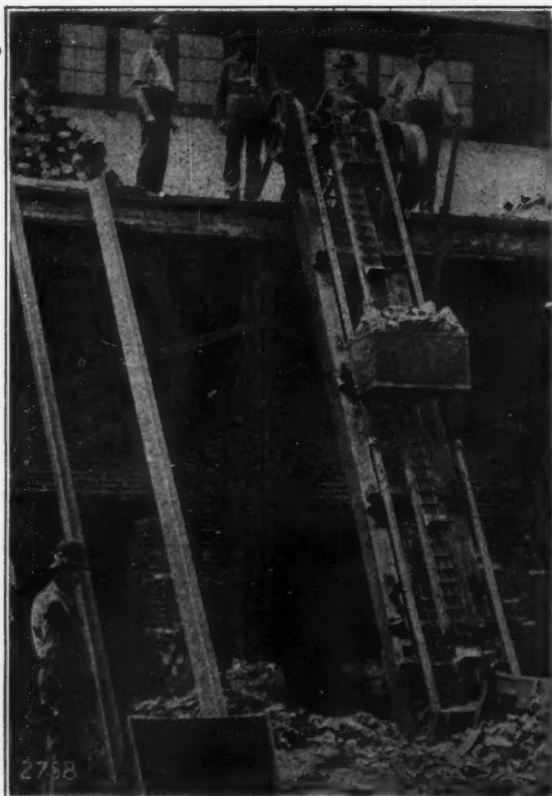


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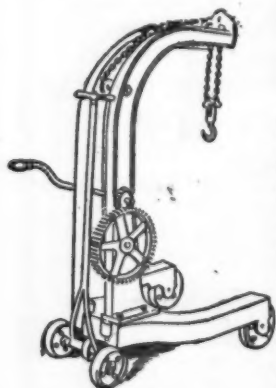


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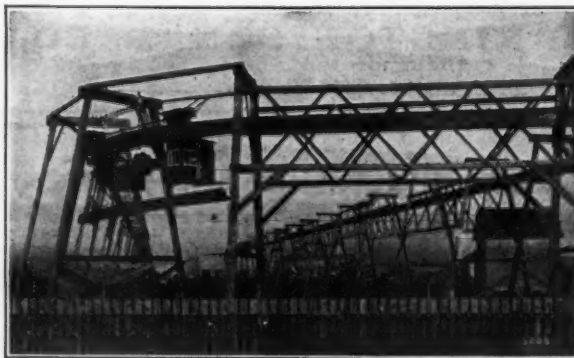
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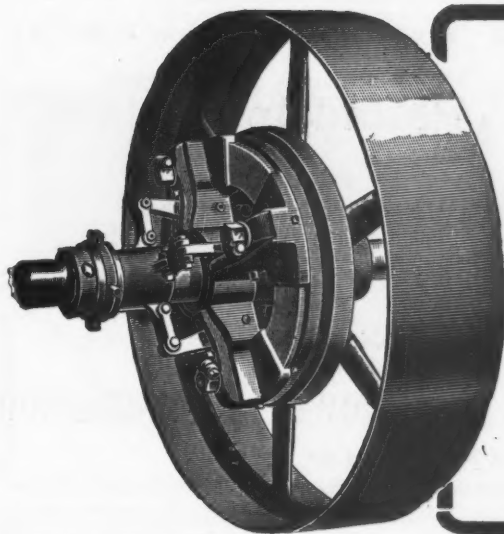
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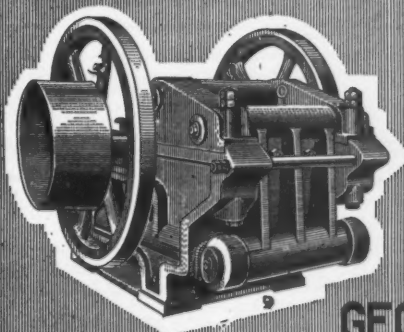
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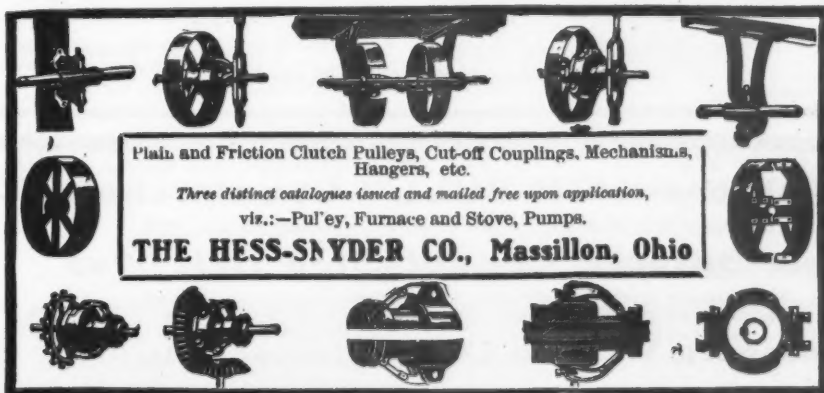
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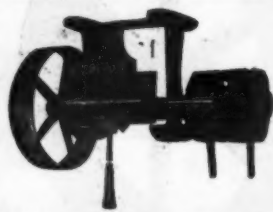
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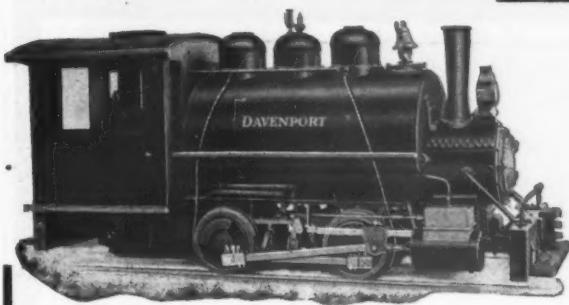
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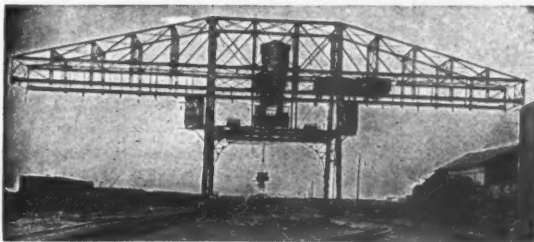
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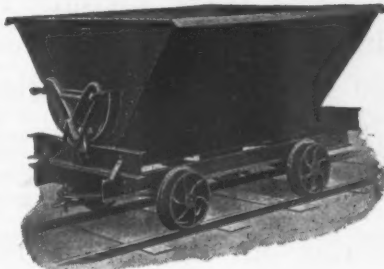
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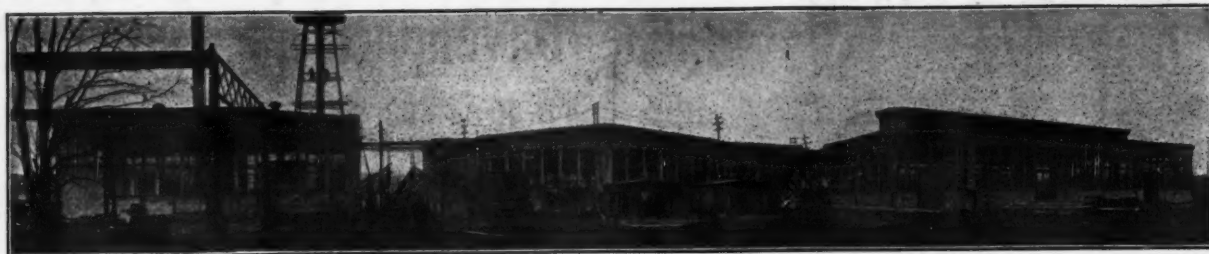
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(Names on Application)

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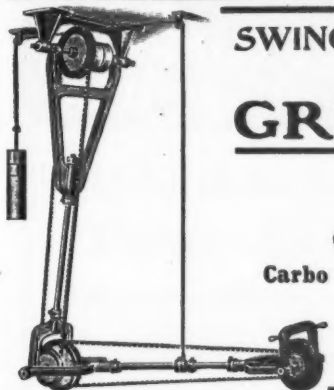
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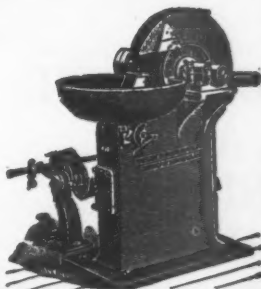


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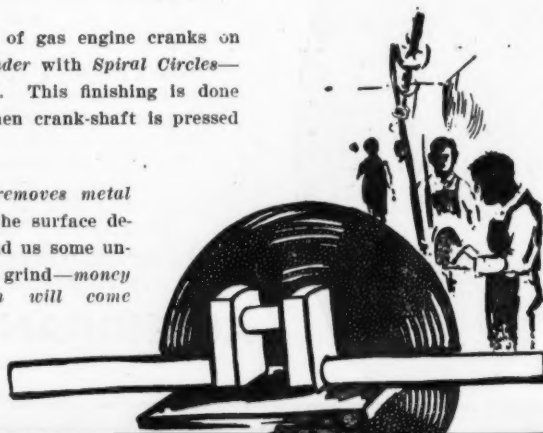


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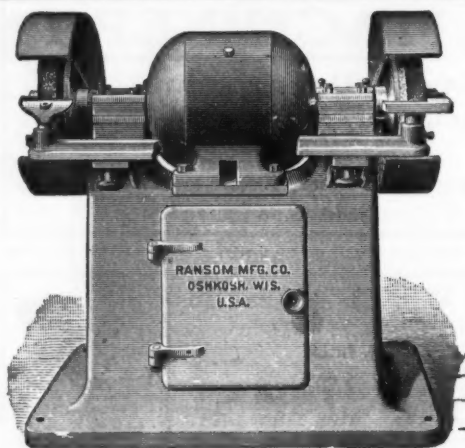
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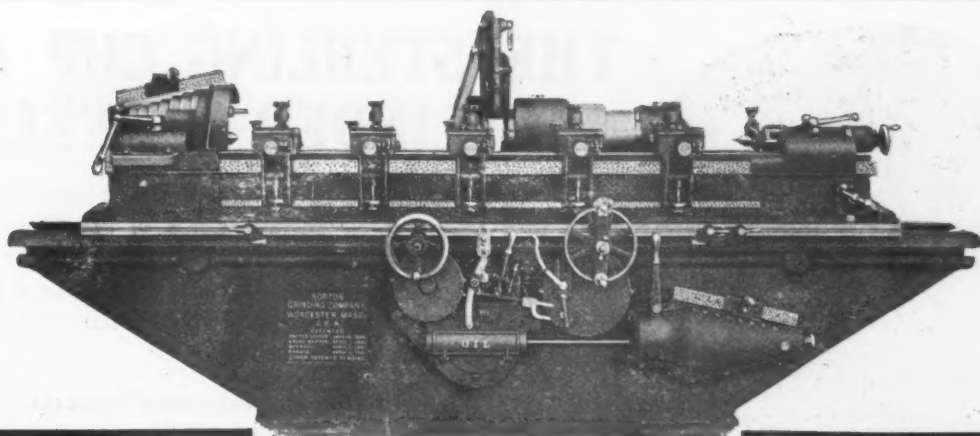
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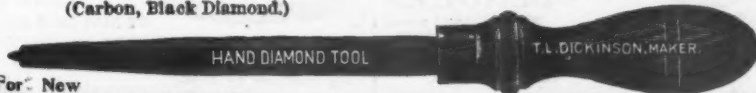
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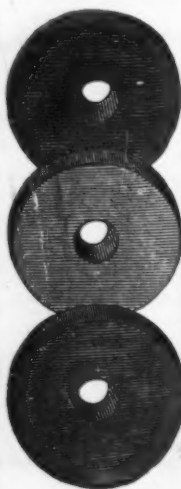
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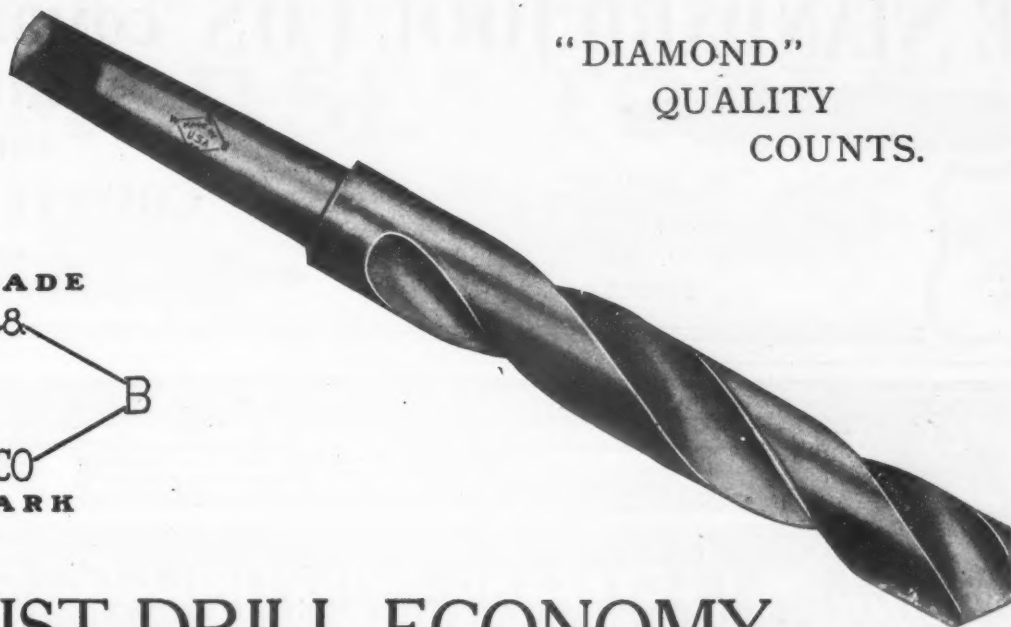
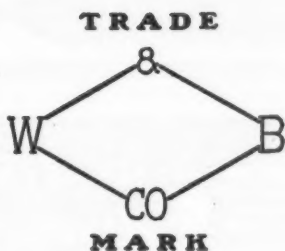
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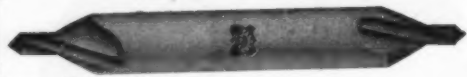
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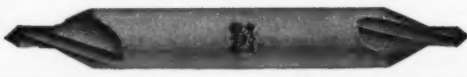
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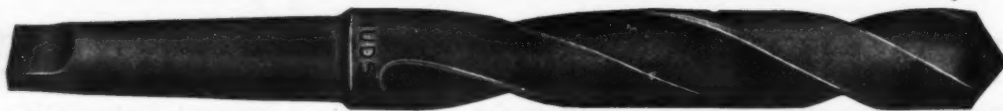
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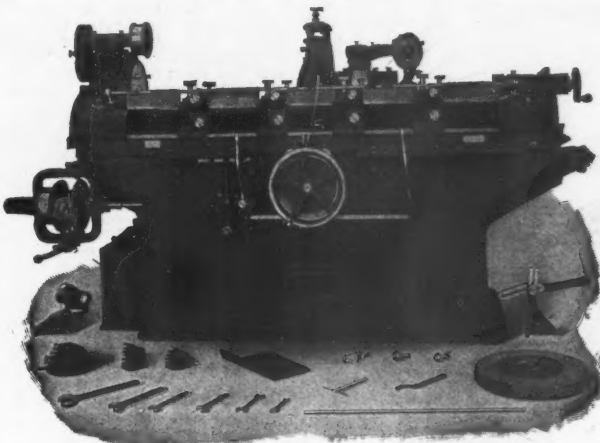
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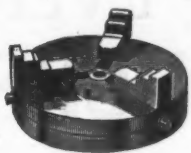
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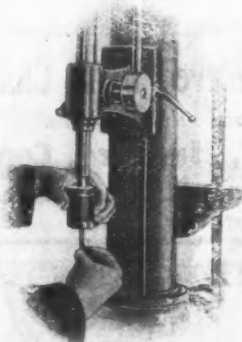
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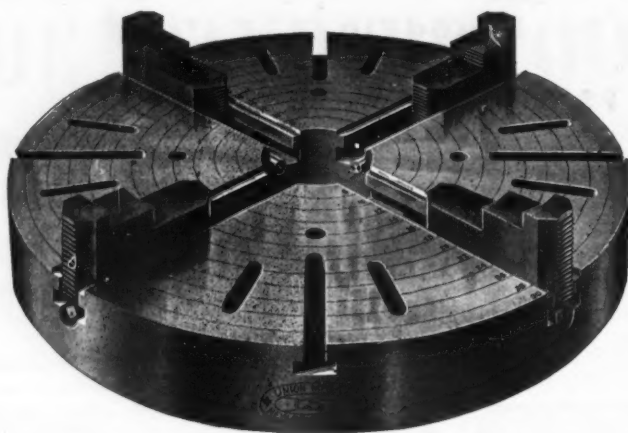
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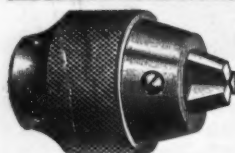
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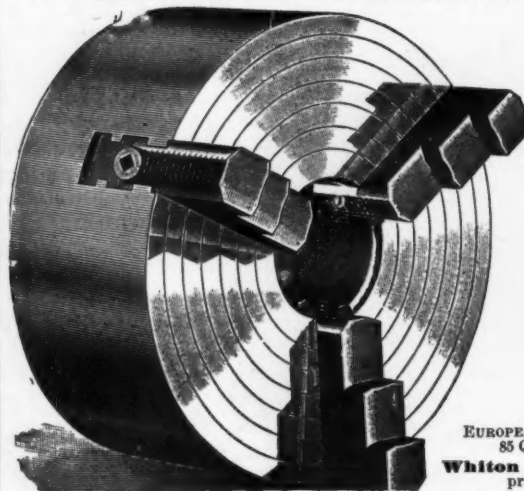
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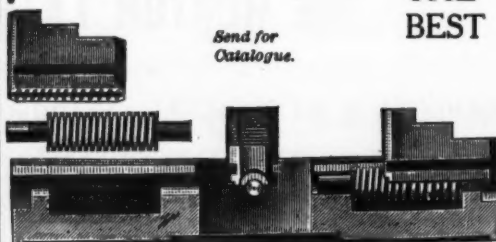
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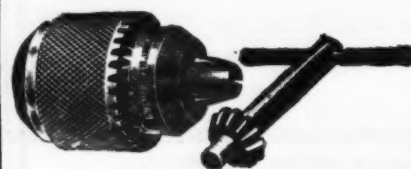
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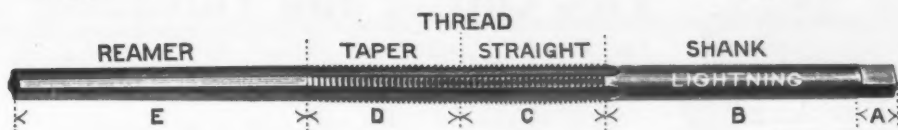
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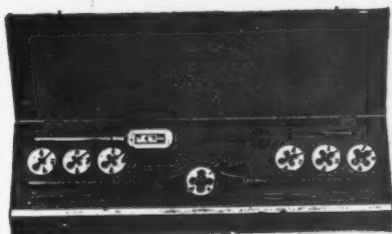
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
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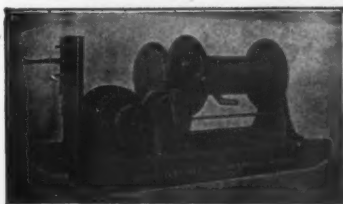
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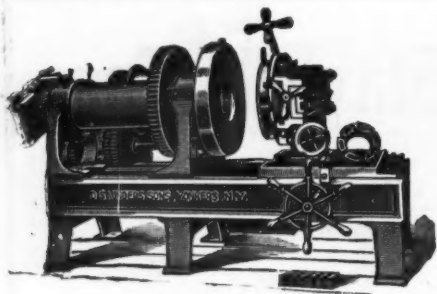
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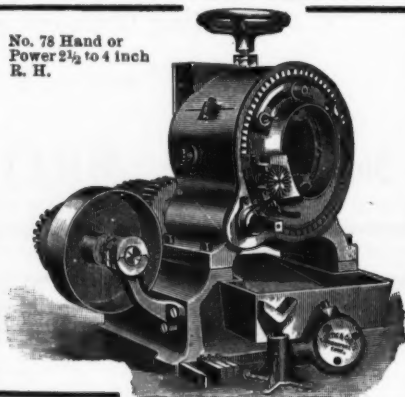
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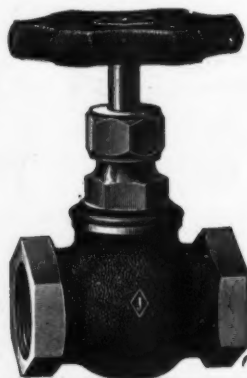
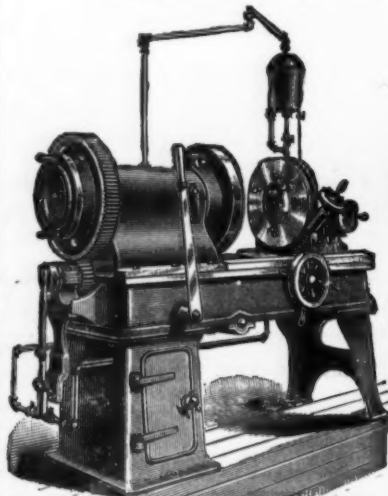


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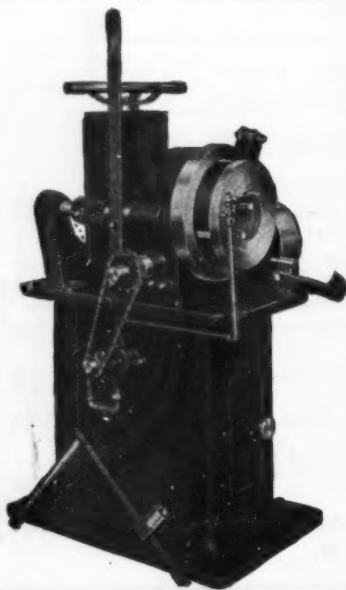
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Malleable and Cast Iron Fittings.
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The Loew Victor Power Pipe Machine



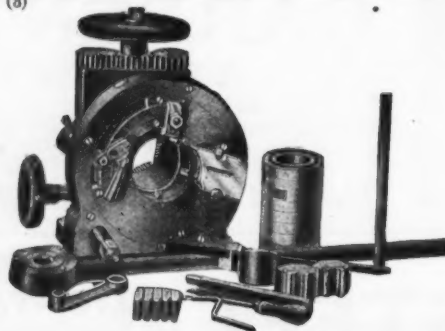
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Absolutely noiseless when in operation.
Self-locking die head. Latest Improved Cut-off. Automatic Opening device.

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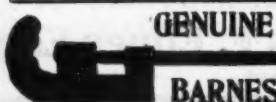
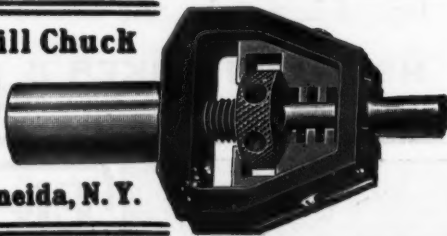
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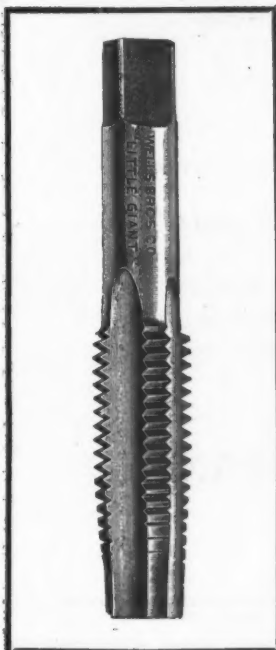
Oneida National Chuck Co., Oneida, N. Y.



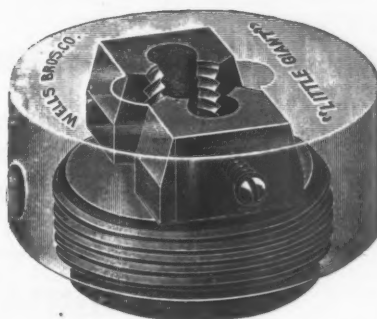
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PIPE CUTTER
BARNES THE BARNES TOOL CO., New Haven, Conn., U. S. A.



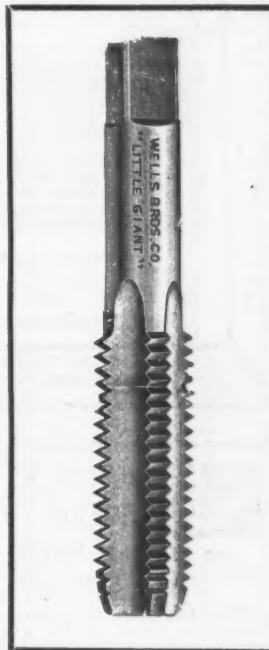
THE first tangible returns from your product is duplicate orders. We can't duplicate your orders, but we can duplicate the Tools that insure duplicate orders. We make Taps, Dies, Screw Plates, Bolt Cutters and Nut Tappers. The first step is to send for our Catalog. Free on Request.



Little Giant.



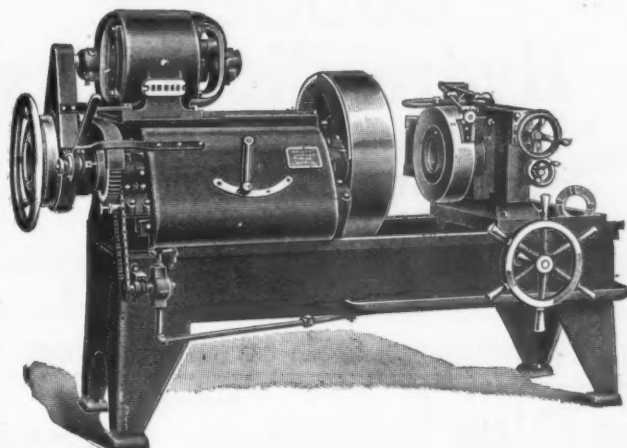
Little Giant.



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You Can Put the Pipe in the Machine from Either End

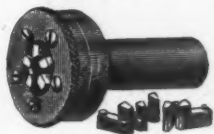
If you have a Sliding Die Head. Just push the head to one side and there is no danger of hurting the dies by dragging the pipe across them.

You can cut off closer to the gripping chuck, too; this will often save the time of rechucking the pipe.

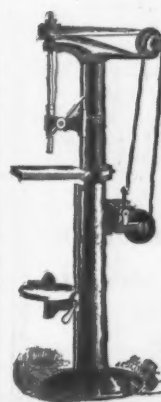
(The 4-inch motor driven machine shown above has our Steel Clad Sliding Head.)

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are SIMPLE, RIGID, STRONG.

Easy and Solid Adjustment.
Perfect Clearance.

They are made in 7 sizes each, right and left hand Offset Shank, and 6 sizes each, right and left hand Straight Shank.

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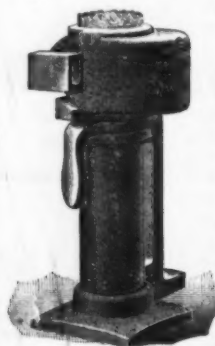


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**This Little Jack
Can Lift Seven Tons**

It's only 13 inches high and it weighs just about 46 lbs., but that merely shows what "W&S" Jacks can do. This Jack doesn't demand a special position to work in either,



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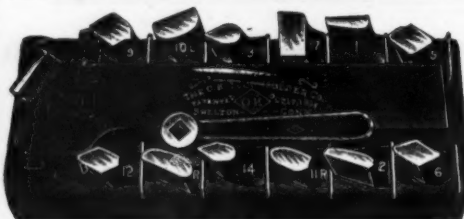
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That your planer tool steel bills can be reduced to a minimum by using guaranteed

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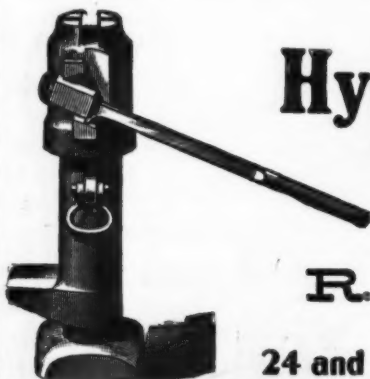
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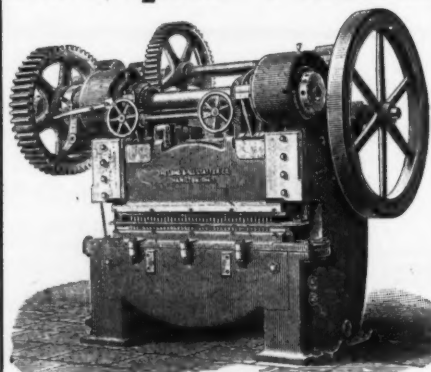
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48 in. between housings, with capacity to punch 40 7-16 in. holes in 3/4 in. plate at one stroke. We build them with capacity to punch 120 3-8 in. holes in 3/4 in. plate at one stroke.

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Large perfect output has pleased buyers of the "STANDARD" in fact and name

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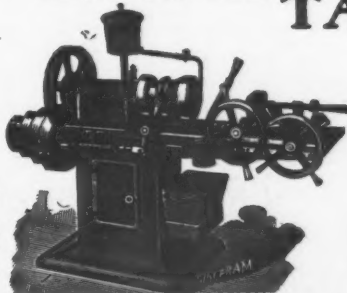
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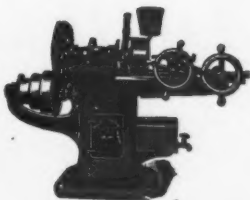
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The Merriman Bolt Cutter Head is Noted for—

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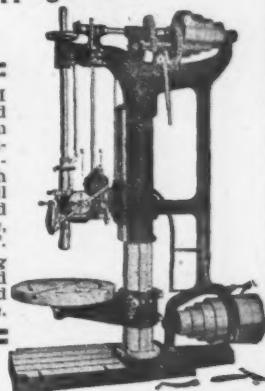
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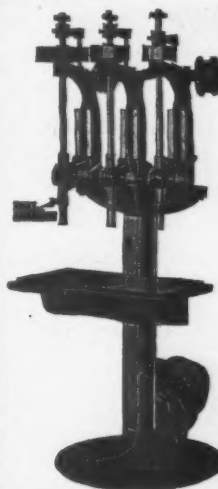
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 New Over **272,000** No. 400 CHAMPION STEEL BLOWERS and STEEL FORGES

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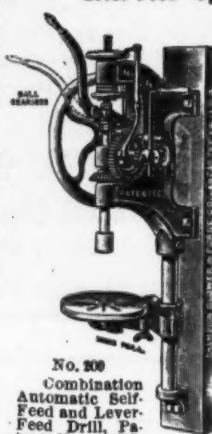
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 Patent Numbers 676,322, 676,323, 676,324, 34,880, 34,881, 34,882, 34,883, 34,884, 34,885, 697,639
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With the LEVER- or AUTOMATIC SELF-FEED 95 Per Cent. in Time and Labor is Saved by the INSTANTANEOUS RAISING of the Drill Bit

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The drill bit is raised out of the work AS QUICKLY AS SNAPPING THE TRIGGER OF A GUN.

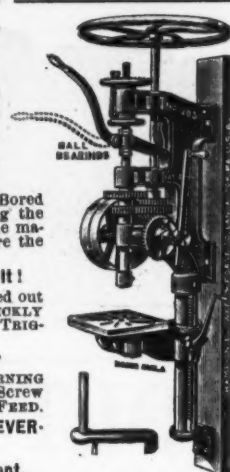
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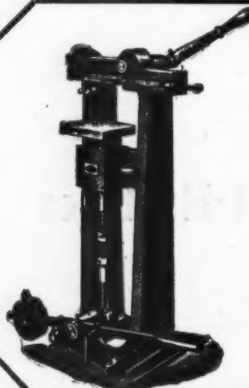
with back gears, self-feed quick return, automatic stop graduated quill and reverse motion.

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Successors to

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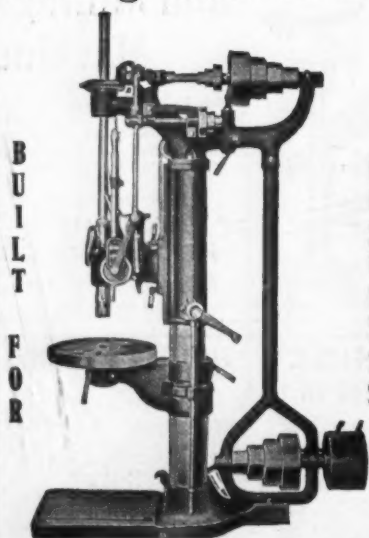
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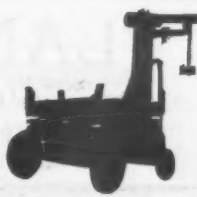
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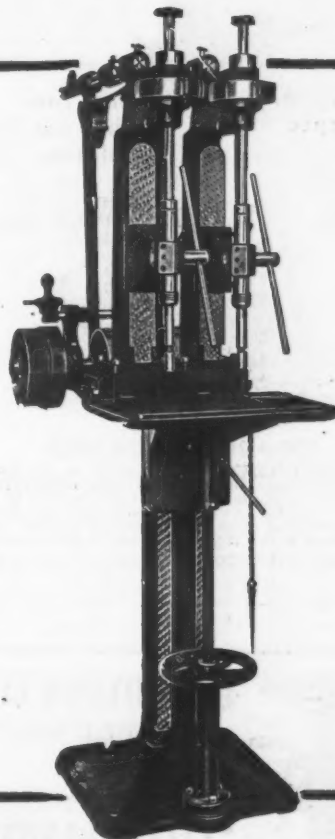
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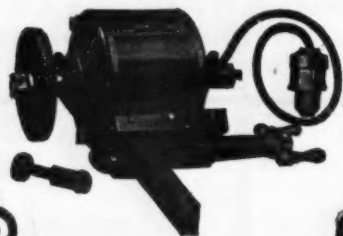
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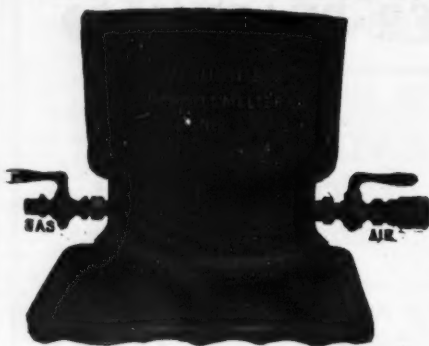
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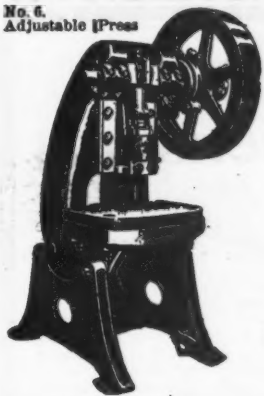
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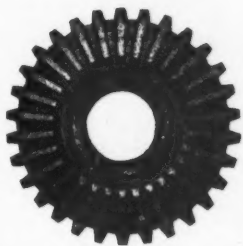
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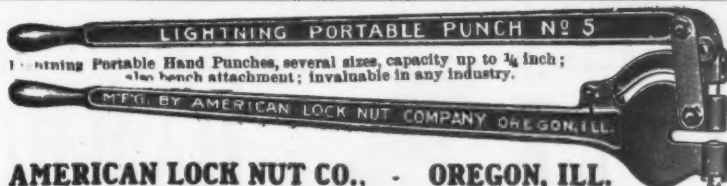
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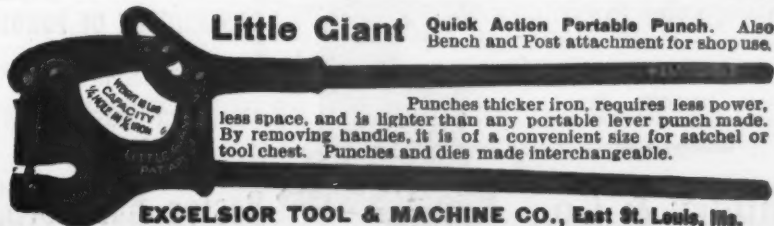
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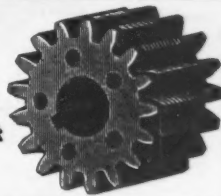
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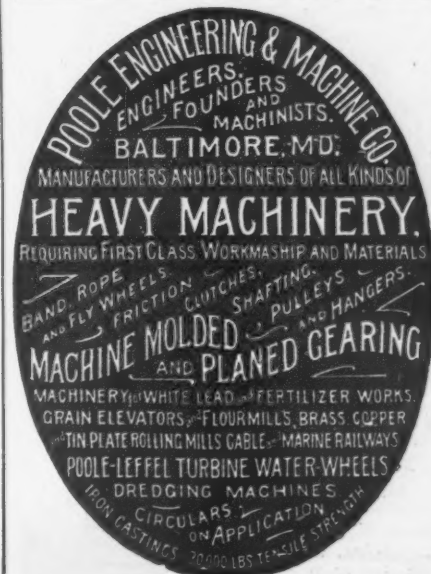
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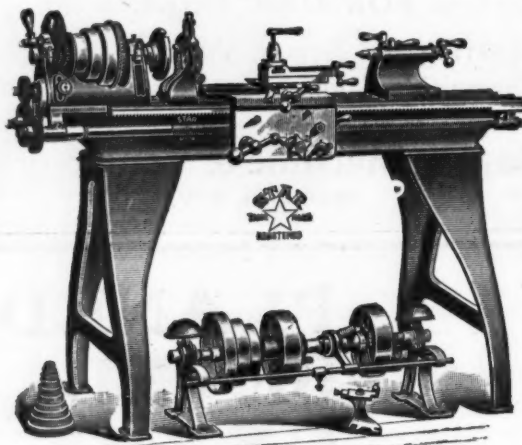

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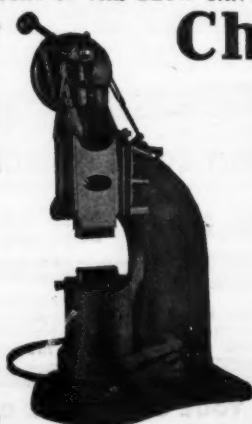
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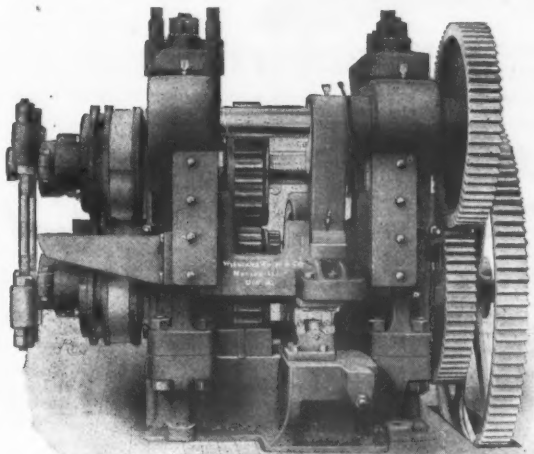
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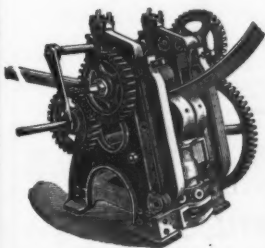
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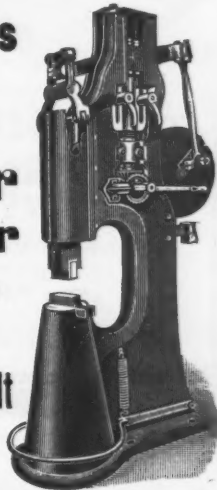
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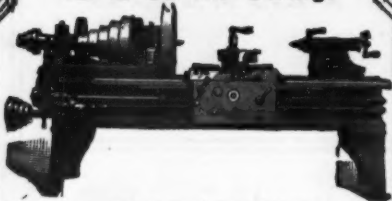
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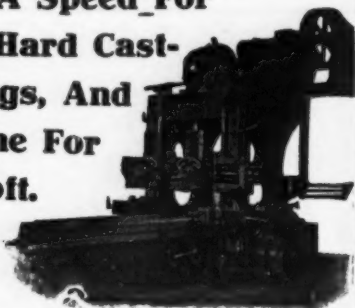
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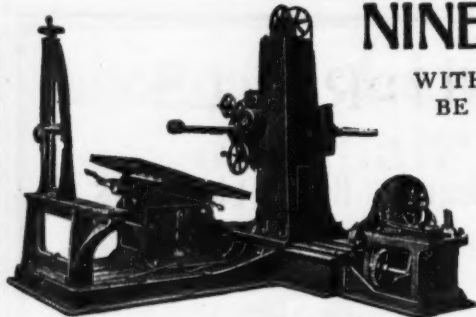
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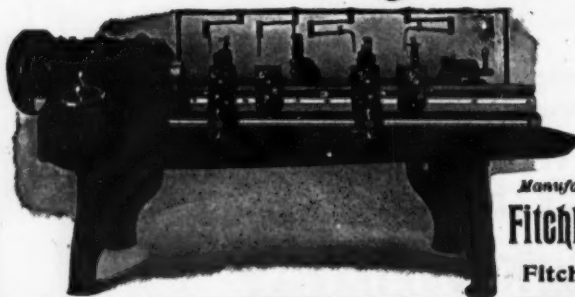
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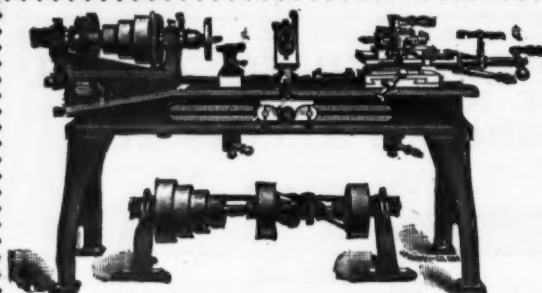
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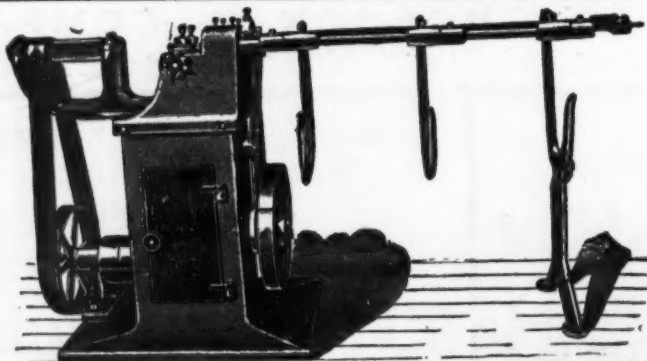
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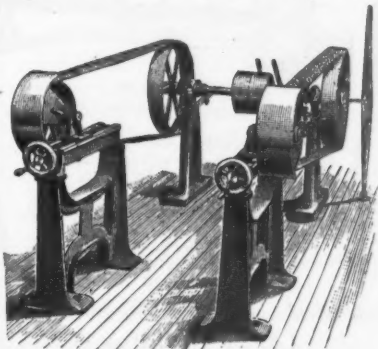
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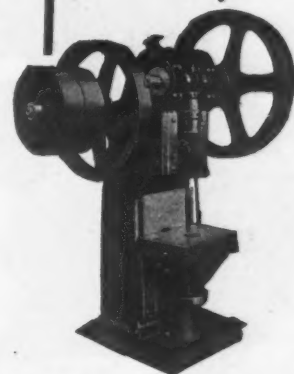
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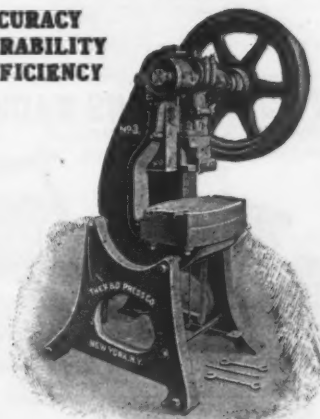
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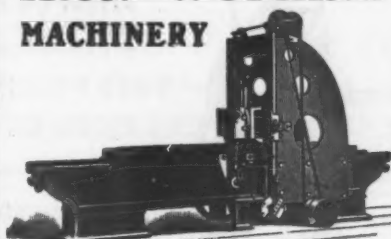
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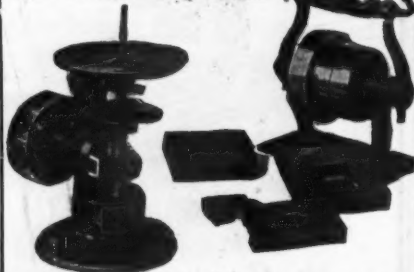
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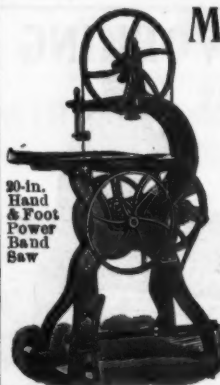
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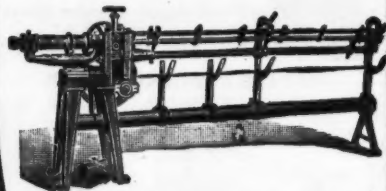
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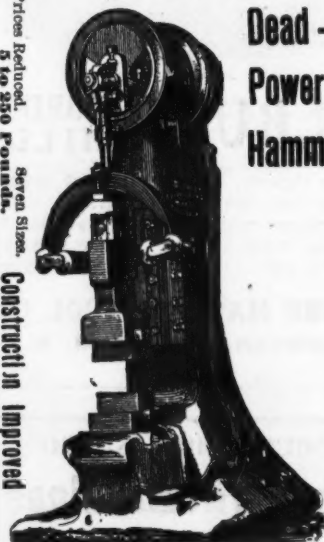
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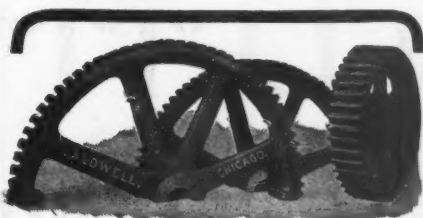
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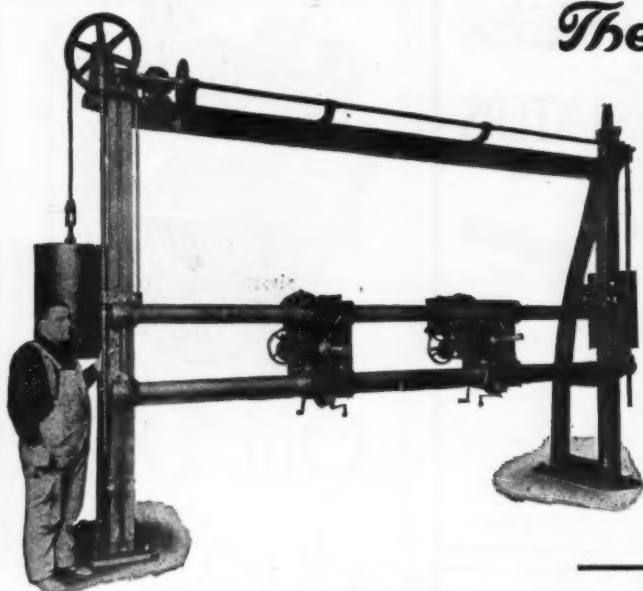
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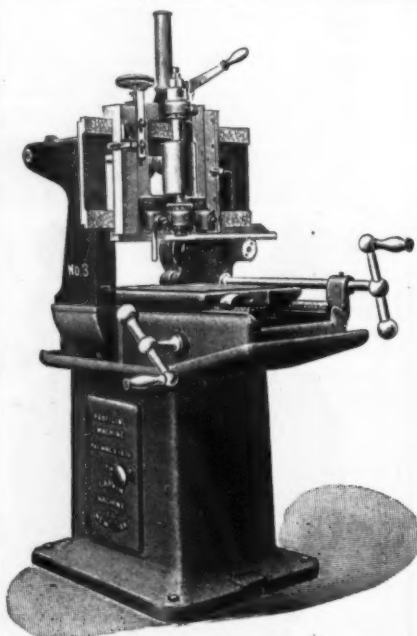
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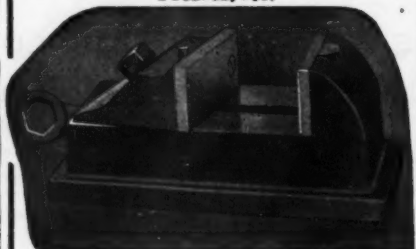
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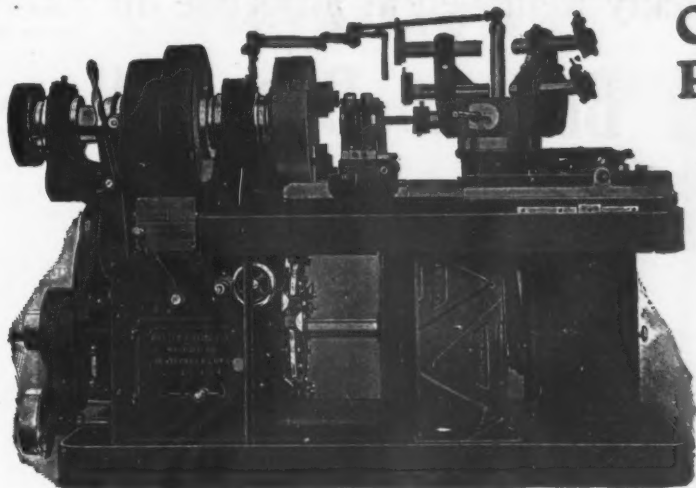
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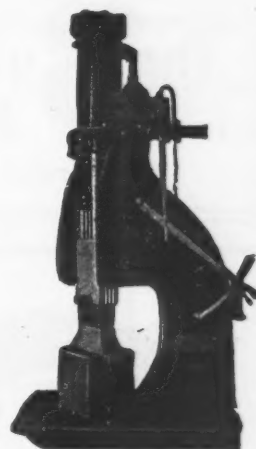
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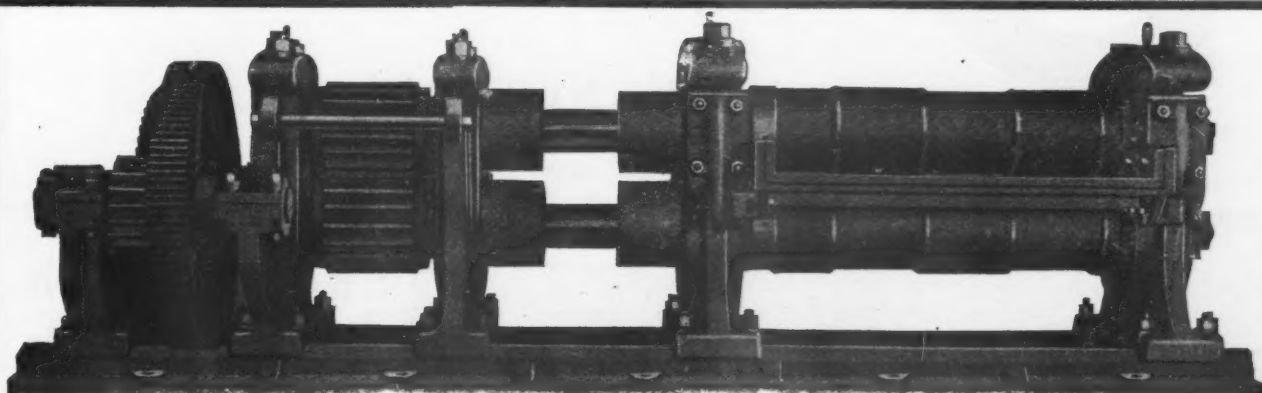
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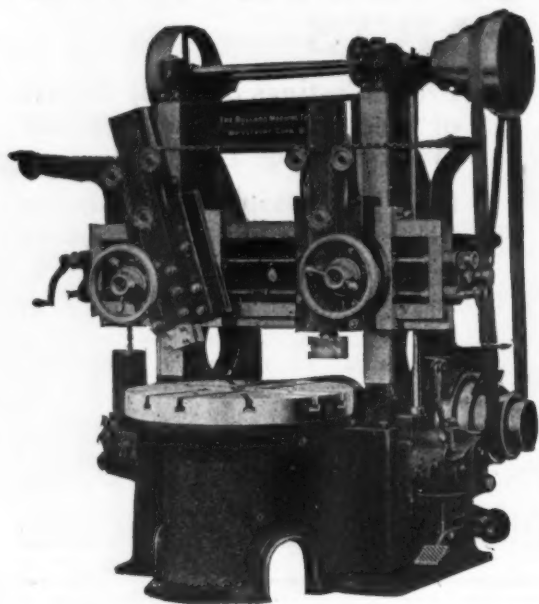
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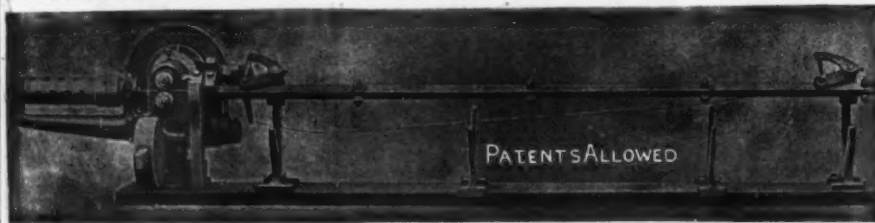
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writes as follows:

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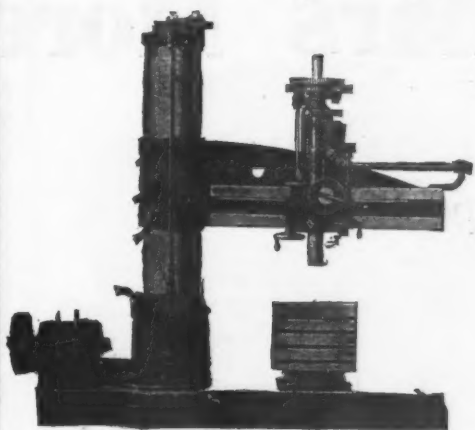
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**THERE ARE GOOD REASONS
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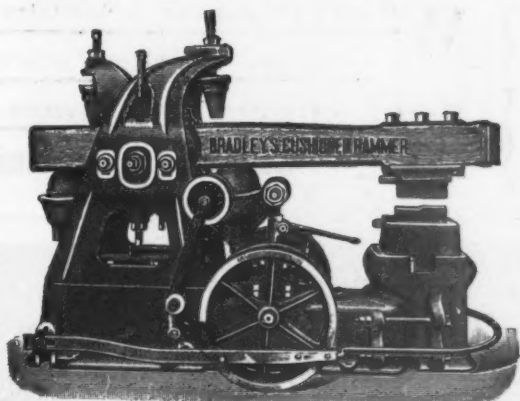
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It matters little that the price is low—it is high enough
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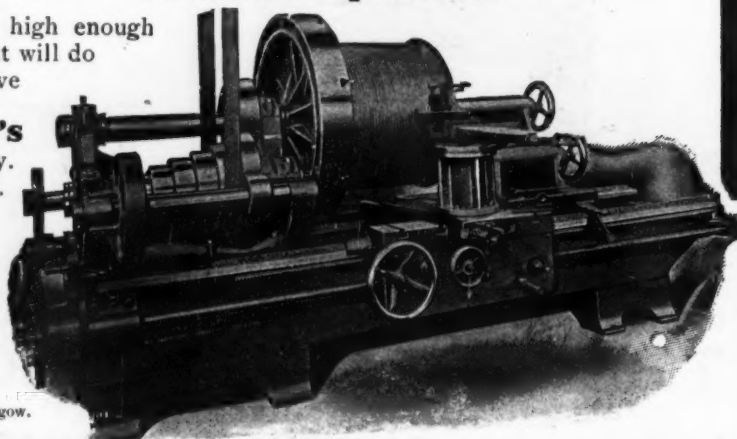
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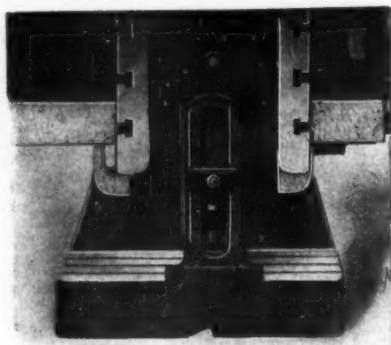
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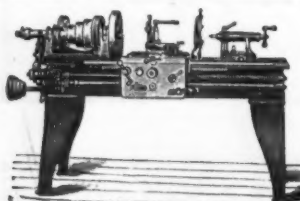
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14
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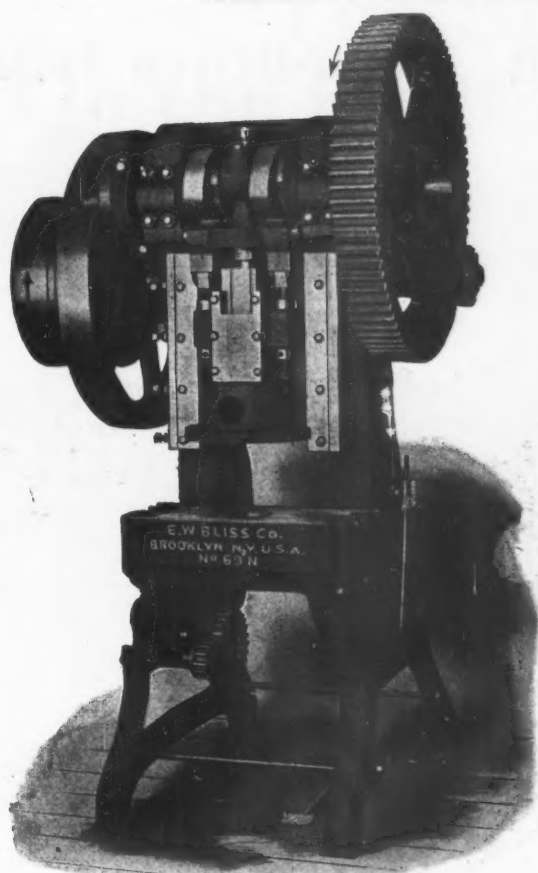
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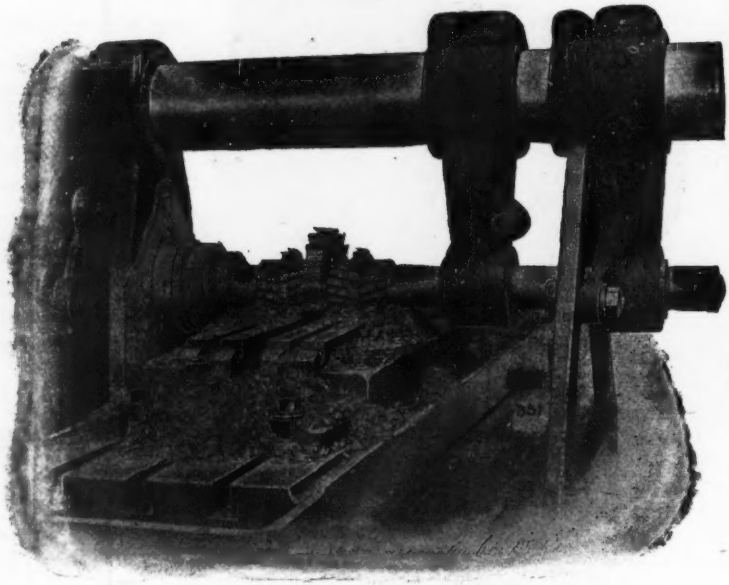
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The No. 4 Plain "Cincinnati" Motor-Driven Miller

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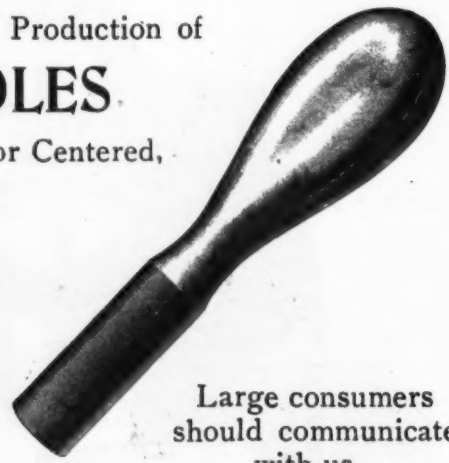
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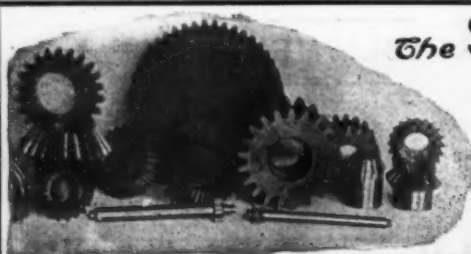


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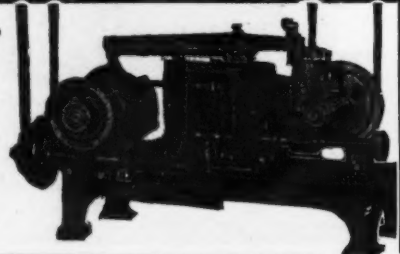
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Saves 50% Expense

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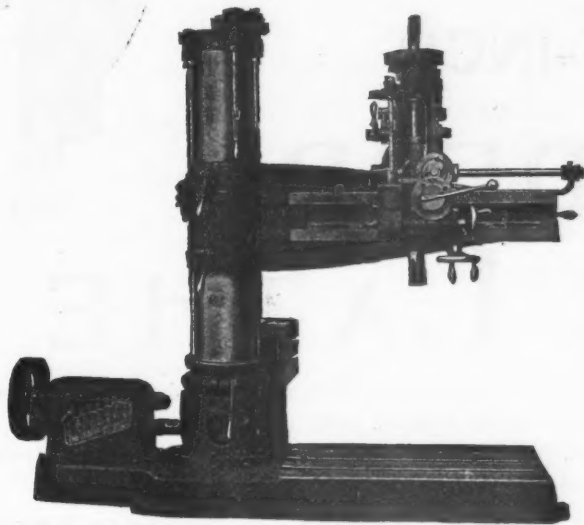
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without a clutch of any kind, and with but a single lever, gives instantly any one of eight changes of speed. It runs smoothly, has ample oiling facilities and permits all speed changes to be made instantly, without noise or shock while the machine is running, and when operated in conjunction with the **triple gears**, furnishes

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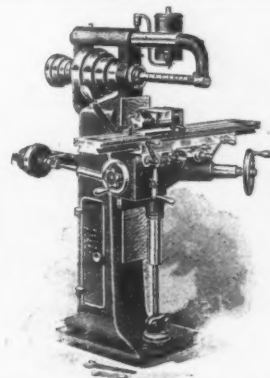


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Greatest Number
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Feeds.

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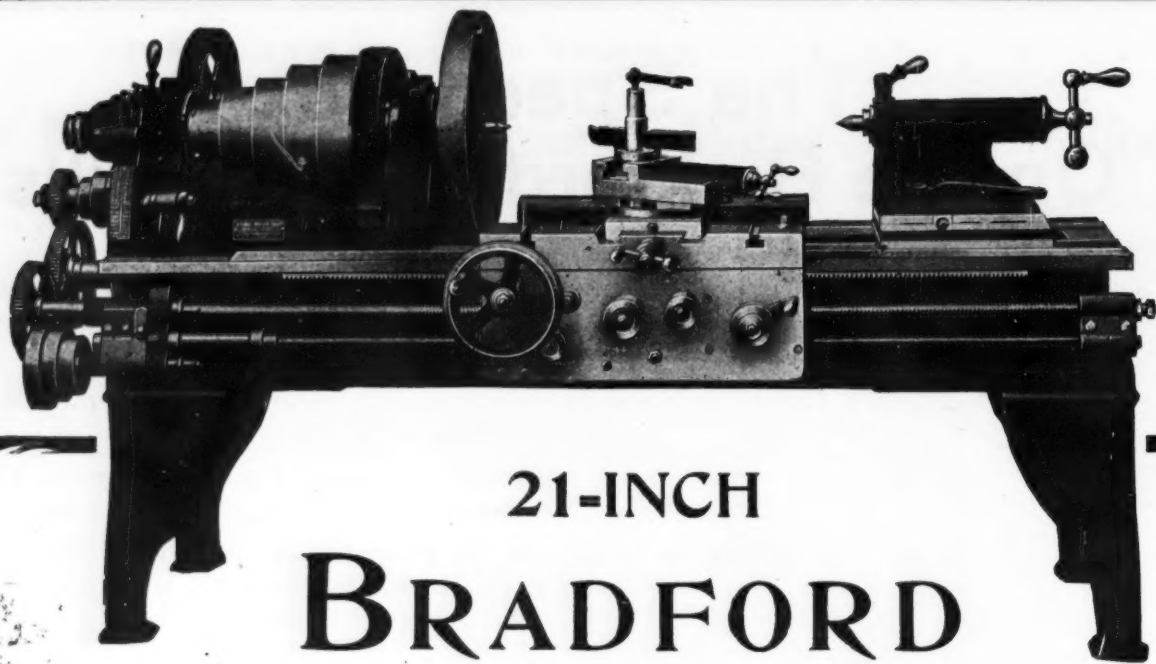
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ARE THE BEST.
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16 to 24 in. Swing
STRICTLY HIGH GRADE TOOLS
GREAVES, KLUSMAN & CO.
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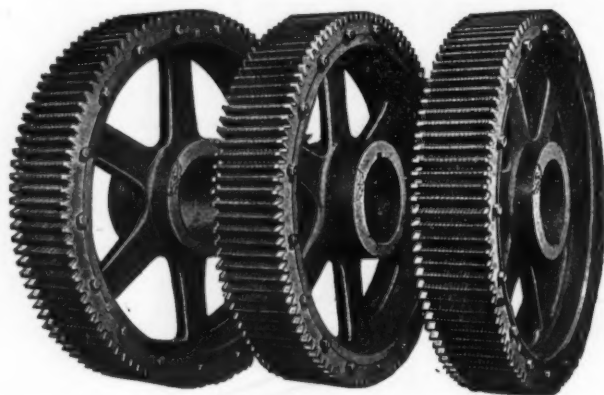
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**BRADFORD
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For General manufacturing purposes this lathe will fill about every need required of a 21-inch lathe. It is not a special machine, but a convenient, modern, well built lathe, calculated to do general work.

We can also furnish the above with Friction Head, Quick Change Gear Device, and other attachments.

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The New Process Rawhide Company
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High Speed Chips

FROM THE
PRENTISS
Line of 20th Century Machine Tools

Published every week, in the interest of the one who is now reading this.

VOL. I. No. 26.

THURSDAY, JUNE 27, 1907.

Price 3 minutes
of your time.

"In the Good Old Summer Time"

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Think of the natural inclination of most manufacturers to accept this season of the year as a "knocking off" period.—a period when a temporary cessation of activity is expected and is calmly acquiesced in; when folks are not half as anxious to rush into the market and buy as they are at other times.

Then think of the golden opportunity this very season offers for the carrying out of the long contemplated improvements to your plant. Remember that the natural indifference of "the other fellow" relieves the market of that pressure which was so manifest when you first thought of adding to your equipment. Remember that at this time more prompt deliveries may be had than at any other.

Then ask us to name the date of delivery on the tools needed to bring your plant to that state of Higher Efficiency which will enable you to name fairly reasonable deliveries on our own product at times when men have discarded the straw hats and are calling for immediate shipment.

Think it over.

Then write us.

We will help you;

For our motto is

"Higher Efficiency."

Chips' Tips

How are you turning your crank shafts?

Ever tried Bogert's Crank Shaft Lathe?—we have one (22") in stock. Send us sample of your work. We will finish it up for you free of charge and tell you the actual time consumed. Then we leave it to you.

We will soon have a 36" x 36" x 12' Cleveland Open Side Planer. The last of a lot recently ordered. Illustrated in "Chips" last week. Inquire for further particulars.

Several of our customers were disappointed because we did not give them the tip the last time we had a 24" Davis Boring and Forming Lathe in stock.

We now have two of these machines—one at Rochester and one at New York. If you allow them to get away from you, don't blame us.

The "Prentiss Stock" of New Tools

Choice Assortment of Brand New Machine Tools Ready to be Shipped Immediately.

LATHES

- 9" Barnes.
- 12" x 8' Silk R. & F. with Taper.
- 14" x 8' Fay & Scott, C. R. P. C. F.
- 14" x 8' Davis, C. R. P. C. F.
- 14" x 8' Lodge & Shipley, Patent Head.
- 14" x 8' Lodge & Shipley, Patent Head.
- 18" x 8' Hendey Norton, C. R. P. C. F.
- 20" x 10' Lodge & Shipley, Patent Head.
- 20" x 12' Lodge & Shipley, Patent Head (Motor Driven)
- 21" x 12' Prentiss C. R. P. C. F.
- 22" Bogert Crank Shaft.
- 22" x 12' Davis, C. R. P. C. F.
- 24" x 14' -8" Rahn, Mayer & Carpenter C. R. P. C. F.
- 24" x 14' Pittsburg C. R. P. C. F.
- 24" x 16' Pittsburg C. R. P. C. F.
- 29" -30" x 12' Field C. R. P. C. F.
- 32" x 10' Fay & Scott, C. R. P. C. F.
- 32" x 15' Pittsburg C. R. P. C. F.
- 90" Ridgway Driving Wheel.
- 32" -50" x 8' Fay & Scott Extension Bed Gap.
- 32" -50" x 12' Fay & Scott Extension Bed Gap.
- 42" -72" x 12' Fay & Scott Extension Bed Gap.

PLANERS

- 24" x 24" x 6' Chandler.
- 24" x 24" x 8' Chandler right angle drive.
- 24" x 24" x 10' Chandler.
- 27" x 27" x 8' Cincinnati.
- 30" x 30" x 8' Cincinnati, 2 Heads.
- 30" x 30" x 8' Cincinnati.
- 30" x 30" x 10' Cincinnati.
- 34" x 24" x 8' Cincinnati, 2 heads.
- 38" x 36" x 10' Chandler, 2 Heads.

VERTICAL BORING AND TURNING MILLS

- 30" Colburn, Turret Head.
- 42" Rogers, with 2 Swivel Heads.
- 42" Colburn, 1 Swivel, 1 Turret Head, 3 Jaw Chuck.
- 48" Colburn, 1 Swivel, 1 Turret Head, 3 Jaw Chuck.
- Power Rapid Traverse.
- 53" Colburn, 2 Swivel Heads.
- 6" Poole with 2 Swivel Heads.
- 7" Ridgway, with 2 Swivel Heads.

MILLERS

- No. 2, 3 and 4 Burke.
- No. 2, 3 and 3½ Fox.
- No. 40 Brainard, Duplex.

DRILLS

- 20" Barnes wheel and lever.
- 20" Barnes Complete.
- 20" Davis Complete.
- 21" Cincinnati wheel and lever.
- 21" Cincinnati Complete.
- 21" Snyder Plain Sliding Head.
- 23" Barnes, complete.

MISCELLANEOUS

- 22" Barnes Sliding Head Complete.
- 30" Bickford Plain Radial Cone Drive.
- 36" Bickford Plain Radial Gear Drive.
- 42" Bickford Plain Radial Gear Drive.
- No. 1 Bickford Improved Plain Gear Drive.
- No. 1 Bickford Standard Plain Radial.
- 10 Spindle Girdam Adjustable.
- No. 43 Penn High Speed.
- No. 65 Penn High Speed.
- No. 2 and 3 Spindle Penn High Speed.
- 3 and 4 Spindle Girdam.

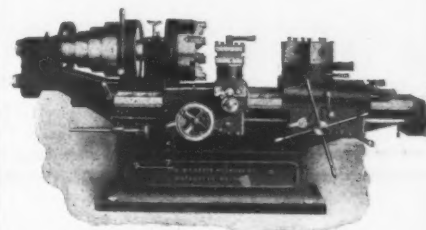
MISCELLANEOUS

- No. 0 V. & O. Power Press.
- No. 1 Hibbard Power Press.
- No. 1 V. & O. Power Press.
- No. 2 and 2½ V. & O. Power Press.
- No. 3 V. & O. Power Press.
- No. 4 Toledo.
- 24" Davis Turret Boring & Forming Machine.
- No. 2 and No. 3 Merriman Bolt Cutters.
- 1½" and 2" Reliance Bolt Cutter.
- No. 7-2" Jarecki Pipe Machine.
- 350 lb. Bell Steam Hammer.
- 64" x 20" x 1½" P. Gould & Eberhardt Gear Cutter.
- 20" Whitney Tool Grinder.
- 20" Blount Tool Grinder.
- 24" Barnes Tool Grinder.
- No. 1 Springfield Oil Separator.
- No. 1, 2, 3 and 4 Q. & C. Shop Saws.
- 10" x 72" Norton Plain Grinder.
- 12" x 32" Iroquois Universal Grinder.
- 24" Becker-Brainard Auto. Spur and Bevel Gear Cutter.

Also an Assortment of Structural and Boiler Makers' Tools.

The Davis Turret Lathe

THIS 26" Boring, Forming and Turning Lathe is desirable in any manufacturing plant having a large number of pieces to finish of a given size. Six or more operations can be performed on the piece before removing from the chuck, including boring, facing, forming and turning, as well as threading, and cuts all threads from 2 to 32 to the inch, with either the carriage or the ram.



It is provided with a friction head, also a positive drive with the back gear. The triple gear meshes into the face plate when desired.

The turret is 14" in diameter with six 2½" holes and has an open center, so that a mandrel can be passed entirely through. Has an automatic stop for each face of the turret, and any face can be tripped at any point desired in the length of the bed, which is a decided advantage.

The turret slide has a bearing of 30" long on the bed.

The carriage has a turret mounted on a cross slide, so that facing as well as turning can be done.

There is an automatic trip on the carriage as well, by which a stop is obtained on each of the four sides of the turret.

Front Spindle Bearing 4½" diameter, 7" long. Back Spindle Bearing 3½" diameter, 5¼" long. Hole in spindle 2". Cone pulley has four sections for 4" belt.

The lathe is provided with six instantaneous quick change feeds, and the spindle has twenty-four speeds.

Greatest distance between the face of chuck and face of turret 47".

A special heavy four-jaw independent chuck is furnished with each machine.

We sell this as well as the Davis Engine Lathes, Drills, Key-eaters, and Cutting Off Machines.

Never think you are beyond attaining "Higher Efficiency."

Prentiss Tool & Supply Co.

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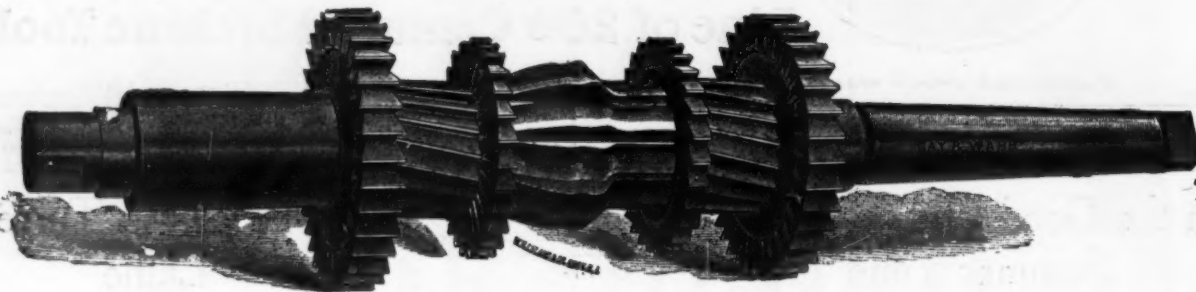
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High Speed Steel Cutters

for Gear cutting, or any kind of Milling Machine work are economical—

Any brand of steel you may select—made to order promptly.



A full line of Carbon Steel Cutters—all kinds and sizes shown in Catalog carried in stock, ready for immediate shipment.

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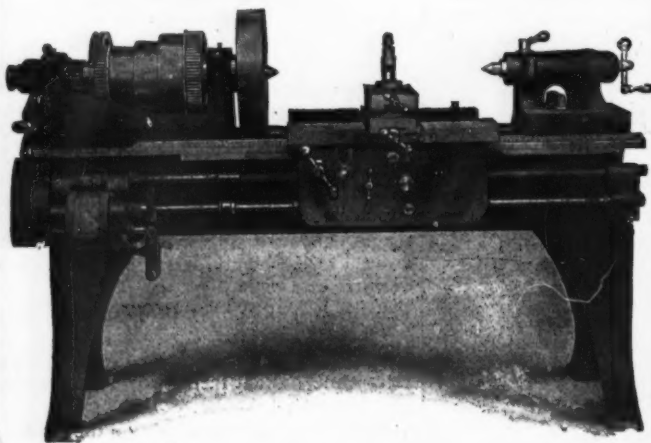
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More than Power Enough

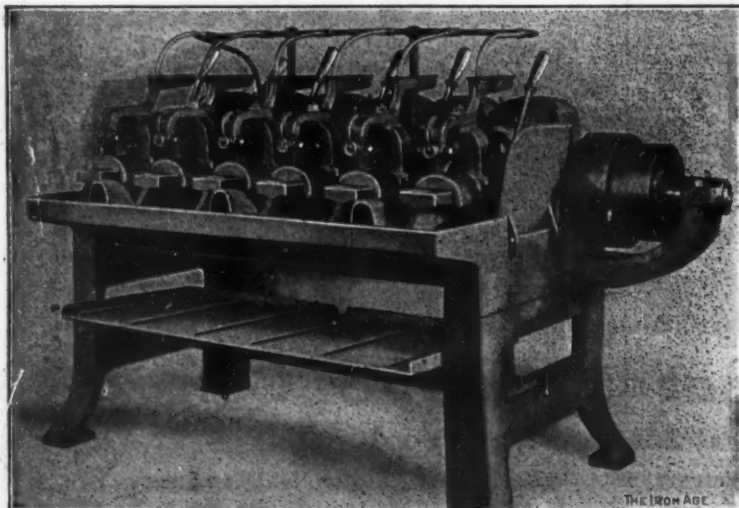
It's a good point to know that your Engine Lathe has "more" than power enough to do the work.

The use of our **Double Back Gears** and **Three Step Cone Pulley** gives "increased power" over that of all other Engine Lathes.

You may not need all the power and speed that goes with our Lathe, but it's "there" if you do. Send for new Catalog.

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"Nine to Ten Thousand 1/2-in. Nuts in 10 Hours From Four Spindles."

That's what one customer says he is getting
**With the New "Coulter
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He gets the same number of 1/2" nuts in the same time from six spindles. These were Hard Malleable Iron Nuts mind you—not common wrought pressed nuts that tap like "old cheese." We back every machine right up with the proof.

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Steel Reels vs. Wooden Reels?

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We are prepared to equip any machine now using Wooden Reels with Steel Reels.

Range of size includes every size up to and including 36".
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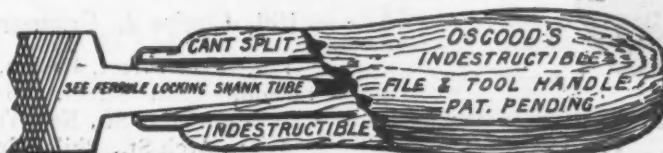
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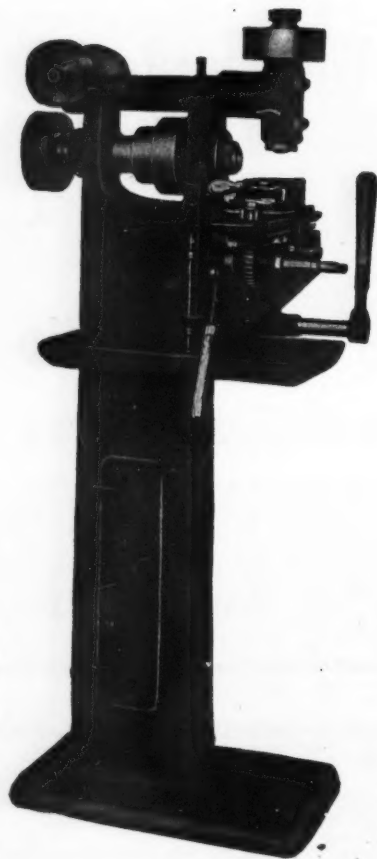
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Modern Methods

The trend of modern methods is toward specialization. You would not use a sledge hammer with which to drive tacks, and for the same reason you ought not to use a large column milling machine, or a heavy horizontal milling machine for taking light cuts.

OUR NEW HAND MILLING MACHINE will do your light work quicker and better than could be done on your heavier machines. You can also save the use of your heavier machines for the larger classes of work, thereby increasing your production.

Large milling machines of the standard makes are very difficult to get for quick delivery, but we can give you prompt delivery on our Hand Milling Machines in large lots, on account of our increased facilities for manufacturing.

Try our new No. 1 machine with vertical attachment. It can be seen at any of our agencies.

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Manufactured in all sizes from 16" to 120", with capacities from 2000 to 175,000 cubic feet per minute. Fan blades are so formed as to give highest efficiency.

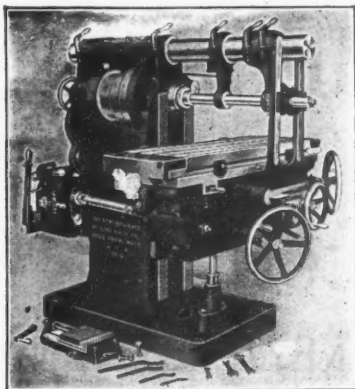
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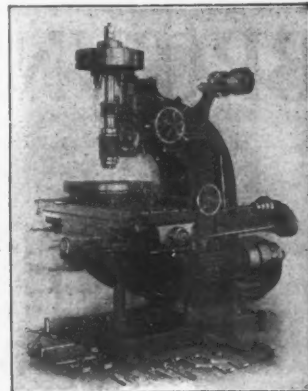
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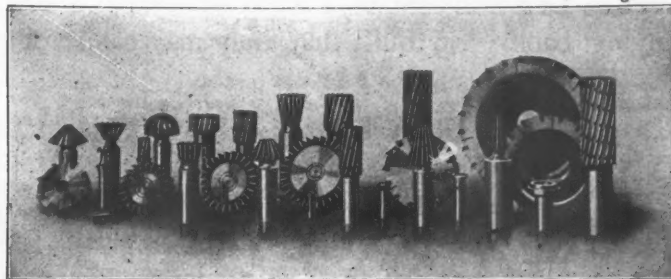
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**Carbon
Steel**



**High-Speed
Steel**

SHOW US YOUR WORK AND WE'LL SHOW YOU OUR METHOD

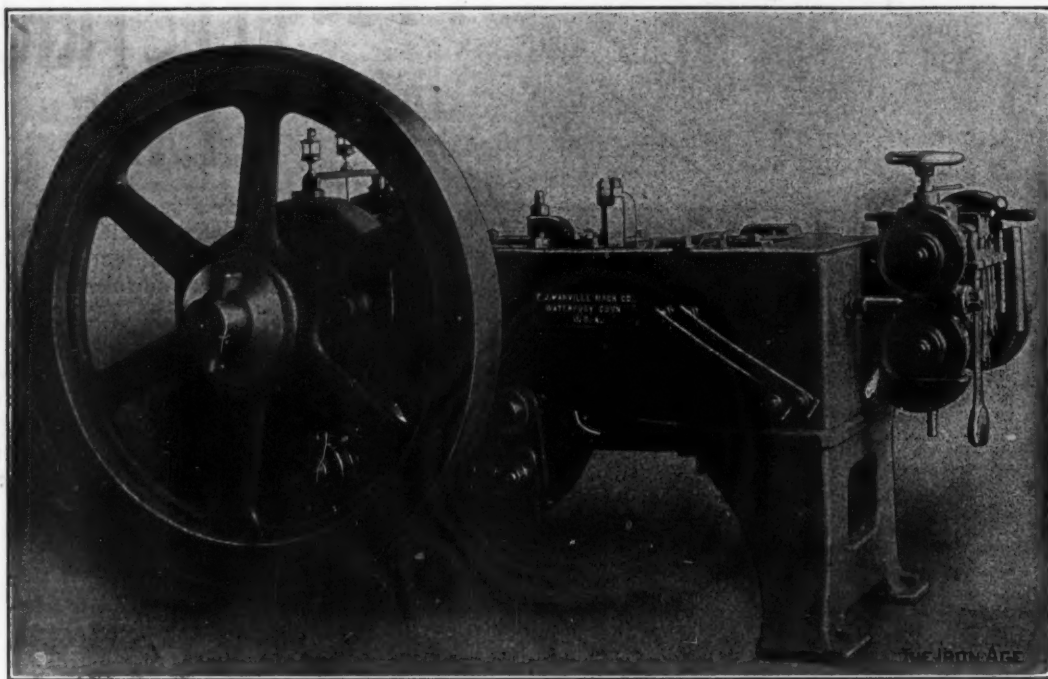
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DOUBLE STROKE OPEN-DIE HEADERS
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Built in 4 Sizes

Get New Cat. C-4

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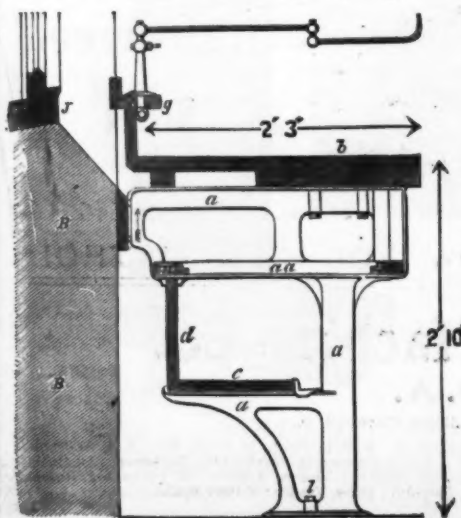
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WORK BENCH LEGS

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Work Bench Legs.—Leg consists of a rigid standard, a bracket for support of shelf and its accompanying back. So built that they may easily be fitted with drawers.



Soda Kettle.—For removing grease and dirt from small tools and machine parts. Coil of pipe used to heat water in which is placed a quantity of soda.

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Low-Priced Tools, but no e
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BOILER & BRIDGE TOOLS "Latest construction."

BOILER PLATE PLANER, 18 ft. at one setting, "H. & J."
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PUNCH & SHEARS, 50" throat, 8" thru 1"
" " " " 15" " 3/4" " 3/4".

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New and 2nd-hand.

70" Double-hd. Driving-wheel Lathe, "Niles."
86" x 18" bed, 18" spindle, wt. 35,000 lbs.
60" x 30" " for heaviest class of work.
42" x 14" " "Quick change" Latest.
33" x 14" " Standard.

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New and 2nd-hand.

48" x 16" one head, "Sellers."
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18" AUTOMATIC GEAR CUTTER, "Brown & Sharpe."
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14 x 20 Atlas Auto R. H. Engine.
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100 H. P. Berryman Closed Heater.
18 x 42 Hamilton Corliss, left hand, girder frame Eng.
All sizes and makes of single and duplex pumps.
Write me your wants, I can fill them.
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Specialties Wanted

Well equipped machine shop employing from 15 to 20 hands desires to secure the manufacture of salable patented articles, either contract or royalty basis, or will buy patents outright if desirable. Address Manufacturer, care The Iron Age, 1515 Real Estate Trust Building, Philadelphia, Pa.

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FOR SALE

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60" x 14" "Powell," three heads.
54" x 23" "Betts," single head.
36" x 12" "Sellers," single head.

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60" "Sellers" vertical.
52" "Poole" vertical.
60" "Sellers" vertical.

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48" x 20" "New Haven."
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20" x 12" "Fitchburg."
20" x 8" "Harrington."
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1-42" Detrich & Harvey Open Side Planer, with 8" bed and supplementary table.

1-1 1/2" Acme Bolt Cutter, late pattern, used less than 4 months.

1-24" x 14" Lodge & Davis Lathe, with Compound Rest and Taper Attachment. A1 condition.

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1-20 x 42 Allis.
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2-400 K. W. Ry. Generators. Direct connected to standard engines. Tandem compound.
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Owing to changes made in our work, we offer

For Immediate Delivery

a full automatic Gould & Eberhardt, extra heavy, 130" x 20"

Spur Gear Cutter

with rim clamping and internal gear attachments, arbors, etc. Used less than four months. Excellent condition.

THE BULLARD MACHINE TOOL CO.,
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FOR SALE

AUTOMATIC THREADING LATHE
(Automatic Machine Co.)

10" x 72", with almost new master lead screw.

MILLING MACHINE No. 18 PLAIN

Kempsmith. Feeds, 50 x 10 x 22 1/2, all automatic.

Both machines in fine condition, now working in our shop.

Delivery: Lathe immediate; Miller, July 1.

The KEMPSMITH MFG. CO. Milwaukee, Wis.

The Lodge & Shipley Machine Tool Co.

Offer at a Bargain the Following Tools
NOW IN USE in their own Shops:

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1-18 x 6 L. & S.
1-18 x 8 "
1-20 x 8 "
1-20 x 10 "
1-24 x 8 "
2-24 x 10 "
3-24 x 12 "
1-30 x 14 "
1-30 x 10 "
1-30 x 14, raised to 42", L. & S.
1-30" massive x 12, raised to 56", L. & S.
1-No. 1 High Speed lathe, 10", L. & S.
1-No. 3 Rapid reduction, L. & S.

TURRET CHUCKING LATHES

1-24 x 8 L. & S.
1-24 x 7 "
1-24 x 10 "
1-20 x 8, raised to 30", L. & S.
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1-No. 2 Berry & Orton.

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1-No. 3-20" Automatic Spur Gear, Brown & Sharpe.
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GRINDERS

1-No. 2 Universal, Sellers.
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PLANERS

1-36 x 36 x 24 three head, Sellers.
1-36 x 36 x 24 four head, Sellers.
1-36 x 36 x 24 double head, Pond.

CINCINNATI, U. S. A.

1500 H. P.

Berryman Heater

IMPROVED WATER-TUBE TYPE

This is a new heater, ready for immediate shipment, for sale at a bargain.

Also a few second hand heaters, thoroughly overhauled and guaranteed to be in good condition.

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LOCOMOTIVES Immediate Delivery.

16 x 24 AMERICAN TYPE, standard, 37 tons, modern appliances, fine order, elaborate fixtures, new tender, overhauled, \$2000.
12 x 16 Dickson 4 wheel S. T., standard gauge, weight 22 tons, fine shape.
9 x 14 Porter, S. T., 36" gauge, first-class condition, boiler inspected, \$1000.
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DALLETT & COMPANY,
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BARGAINS

22' x 16' Blaisdell Engine Lathe.

60' x 33' Betts T. G. "

32' Pond Drill, B. G. and P. F.

2-No. 12 Bliss Power Presses.

42' Gleason Gear Planer.

21" x 18" x 4'-6" Putnam Planer.

18' Hilles & Jones Bending Rolls.

No. 1 Hilles & Jones Angle Shear.

11-2' Side Lever Heading Machine.

50' Stevens Pulley Lathe, 2 Tools.

SENSITIVE DRILLS, SCREW MACHINES, MILLERS, PRESSES, etc.

Can give bargains at all times in new and second-hand machinery for immediate shipment.

GEO. E. AFFLECK, 107 Liberty St., New York City

In Stock for Immediate Shipment

Duplex Pumps

20" x 8" x 10" Canton, outside packed plunger, 7" suc., 6" dis.
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 16" x 12" x 8" Smith-Valle, 8" suc., 7" dis.
 14" x 10" x 10" Gordon, 7" suc., 6" dis.
 14" x 7" x 12" Smith-Valle underwriters' fire pump, 8" suc., 6" dis.
 12" x 7" x 10" Buffalo, 4" suc., 4" dis.
 12" x 8" x 10" Hughes, 6" suc., 5" dis.
 18" x 12" x 10" Worthington, 10" suc., 8" dis.
 16" x 8" x 10" Worthington, 6" suc., 6" dis.
 16" x 8" x 12" Smith-Valle, 7" suc., 6" dis.
 14" x 20" x 12" x 15" Worthington compound, 12" suc., 10" dis.
 2-14" x 20" x 10" Blake compound, 8" suc., 7" dis.
 14" x 20" x 10" Deane compound, 10" suc., 8" dis.
 14" x 20" x 10" Worthington compound, 9" suc., 7" dis.
 14" x 10" x 10" Worthington, 7" suc., 6" dis.
 14" x 8" x 10" Worthington, 6" suc., 5" dis.
 14" x 7" x 12" Hall, 5" suc., 4" dis.
 12" x 18" x 10" Worthington comp., 8" suc., 7" dis.
 12" x 18" x 12" x 10" Worthington comp., 8" suc., 7" dis.
 12" x 18" x 10" Worthington comp., 7" suc., 6" dis.
 12" x 18" x 8" x 10" Deane comp., 8" suc., 6" dis.
 12" x 16" x 18" Blake, 14" suc., 12" dis.
 12" x 15" x 10" Worthington, 10" suc., 10" dis.
 12" x 7" x 10" Blake, 8" suc., 6" dis.
 12" x 7" x 10" Worthington, 6" suc., 5" dis.
 12" x 7" x 10" Worthington, 5" suc., 4" dis.
 12" x 7" x 10" Worthington, 5" suc., 4" dis.
 12" x 7" x 10" Worthington, 6" suc., 5" dis.
 12" x 7" x 10" Deane, 6" suc., 5" dis.
 12" x 6" x 10" Worthington, 6" suc., 5" dis.
 10" x 16" x 8" x 12" Smith-Valle compound, 8" suc., 7" dis.
 10" x 6" x 12" Knowles, 5" suc., 4" dis.
 10" x 6" x 10" Worthington, 4" suc., 3" dis.
 10" x 6" x 12" Knowles, 5" suc., 4" dis.
 8" x 12" x 7" x 10" Worthington compound, 5" suc., 5" dis.
 8" x 8" x 12" Snow, 6" suc., 5" dis.
 7" x 4" x 7" Canton, 4" suc., 3" dis. NEW.
 6" x 4" x 6" Eclipse, 2" suc., 2" dis.
 6" x 4" x 6" Worthington, with receiver, 2" suc., 1" dis.
 5" x 3" x 6" Canton, 2" suc., 1" dis.
 2-5" x 3" x 6" Laidlaw-Dunn, with receiver, 2" suc., 2" dis.
 4" x 2" x 4" McGowan, 1" suc., 1" dis.
 4" x 2" x 4" McGowan, 1" suc., 1" dis.
 8" x 5" x 10" Snow, 5" suc., 4" dis.
 2-7" x 5" x 10" Canton, 4" suc., 3" dis. NEW.
 7" x 5" x 10" Fairbanks, 4" suc., 3" dis.
 7" x 4" x 6" Buffalo, 3" suc., 2" dis.
 6" x 5" x 10" Worthington, 4" suc., 3" dis.
 6" x 1" x 6" Worthington, 1" suc., 1" dis.
 6" x 4" x 6" Snow, with receiver, 3" suc., 2" dis.
 6" x 4" x 6" Worthington, 3" suc., 2" dis.
 6" x 4" x 6" Snow, with receiver, 3" suc., 2" dis.
 5" x 3" x 5" Worthington, 2" suc., 1" dis.
 4" x 2" x 4" Worthington, 2" suc., 1" dis.
 4" x 2" x 4" Worthington, 2" suc., 1" dis.
 3" x 2" x 3" Deane, 1" suc., 1" dis.

Single Cylinder Pumps

20" x 14" x 20" Blake, 10" suc., 8" dis.
 16" x 10" x 18" Blake, 8" suc., 7" dis.
 16" x 7" x 24" Wilson-Snyder, outside center packed, 6" suc., 3" dis.
 16" x 10" x 18" Deane, 8" suc., 6" dis.
 16" x 7" x 24" Wilson-Snyder, outside center packed, 6" suc., 3" dis.
 12" x 7" x 12" Deane, 5" suc., one 3" and one 3" dis.
 2-10" x 16" x 16" Blake, 8" suc., 6" dis.
 14" x 9" x 18" Wilson-Snyder, 7" suc., 5" dis.
 14" x 8" x 12" Niagara fire pump, 6" suc., two 3" dis.
 12" x 7" x 12" Holly Mfg. Co., 5" suc., 4" dis.
 11" x 7" x 10" Smith-Valle, 4" suc., 3" dis.
 10" x 6" x 12" Cook & Chick No. 7, 4" suc., 4" dis.
 10" x 4" x 10" Hughes, 4" suc., 2" dis.
 10" x 8" x 12" Blake, 5" suc., 4" dis.
 10" x 6" x 12" Blake, 3" suc., 3" dis.
 9" x 5" x 10" Niagara, 3" suc., 2" dis.
 2-8" x 8" x 12" Knowles, 5" suc., 5" dis.
 8" x 5" x 10" Blake, 3" suc., 2" dis.
 8" x 5" x 12" Deane, No. 6, 3" suc., 2" dis.
 8" x 5" x 10" Blake, 3" suc., 2" dis.
 8" x 9" x 10" Hughes, 4" suc., 3" dis.
 8" x 6" x 10" Marsh, 4" suc., 3" dis.
 7" x 4" x 10" Deane, 3" suc., 2" dis.
 7" x 4" x 6" Blake, 2" suc., 1" dis.
 6" x 3" x 7" Cameron, 2" suc., 1" dis.
 7" x 4" x 6" Blake, 3" suc., 2" dis.
 2-8" x 5" x 10" Blake, 3" suc., 2" dis.
 7" x 5" x 10" Knowles, 3" suc., 2" dis.
 7" x 5" x 10" Deane No. 5, 3" suc., 2" dis.
 6" x 10" x 12" Buckley, 5" suc., 4" dis.
 6" x 8" x 12" Knowles, 5" suc., 4" dis.
 6" x 5" x 7" Blake, 3" suc., 2" dis.
 6" x 5" x 7" Blake, 4" suc., 3" dis.

Centrifugal Pumps

Boggs & Clark No. 5 belt driven, 6" suc., 5" dis. NEW.
 Wickes No. 8 belt driven, 10" suc., 8" dis. NEW.
 Wickes No. 6, with direct connected 6" x 6" upright engine, 8" suc., 6" dis. NEW.
 Wickes No. 6 belt driven, 8" suc., 6" dis. NEW.
 Bellows Falls No. 7, belt driven, 7" suc., 7" dis. NEW.
 2-Fulton No. 12, belt driven, 14" suc., 12" dis. NEW.
 Fulton No. 8, belt driven, 10" suc., 8" dis. NEW.
 2-Fulton No. 5, 6" suc., 5" dis. NEW.
 2-Fulton No. 4, belt driven, 6" suc., 4" dis. NEW.
 6" Boggs & Clark centrifugal pump for direct connection.
 Wickes No. 8, direct connected to upright engine, 10" suc., 8" dis. NEW.
 Wickes No. 4, motor driven, 5" suc., 4" dis.
 4-Wickes No. 4, direct connected to upright engine.

Air Compressors

18" x 34" x 30" Rand duplex Corliss, 13" air outlet, cap. 7500 ft. free air.
 30" x 19" x 28" x 30" Norwalk tandem comp., cap. 2200 ft. free air.
 10" x 30" x 20" Blake, direct acting, steam driven, 10" air outlet, capacity 700 ft. free air.
 10" x 16" x 20" Smith-Valle, capacity 463 ft. free air.
 12" x 12" Laidlaw-Dunn-Gordon, belt driven, cap. 372 ft. free air.
 11" x 8" x 6" Pedrick & Ayer, vertical belt driven, 1" air outlet, cap. 60 ft. free air.
 11" x 6" x 6" Pedrick & Ayer, No. 1, comp. belt driven.
 10" x 18" x 18" Snyder-Hughes, 3" air outlet, cap. 132 ft. free air.
 15" x 8" x 10" Pedrick & Ayer, vertical belt driven, 3" air outlet, cap. 132 ft. free air.
 2-15" x 8" x 10" Pedrick & Ayer, vertical compound belt driven, cap. 110 to 132 ft. free air.
 12" x 14" Ingersoll-Sergeant, belt driven, cap. 285 ft. free air.
 12" x 12" x 12" McGowan, straight line, cap. 185 ft. free air.
 11" x 6" x 6" Pedrick & Ayer, vertical belt driven, cap. 60 ft. free air.
 11" x 6" x 6" Pedrick & Ayer, No. 1, comp. belt driven.
 10" x 12" Ingersoll, belt driven.
 10" x 18" x 18" Snyder-Hughes, 3" air outlet, cap. 132 ft. free air.
 10" x 18" x 18" Blake single cyl., steam, 6" air outlet, cap. 250 ft. free air.
 2-10" x 14" x 12" Laidlaw-Dunn-Gordon duplex, steam driven, 5" air outlet, cap. 510 ft. free air.
 8" x 9" Clayton, belt driven.
 8" x 8" x 8" Allen, straight line, steam, 1" air outlet, cap. 60 ft. free air.
 7" x 6" upright, with direct connected 7" H.P., 110 volt motor, cap. 40 ft. free air.
 6" x 6" x 6" Snyder-Hughes, straight line, cap. 29 ft. free air.
 4" x 5" upright, belt driven air pump, 1" air outlet.
 10" x 14" Clayton, belt driven.
 10" x 9" American, belt driven, cap. 122 ft. free air.
 8" x 10" x 8" Knowles single air pump, with receiver.
 8" x 8" x 8" Allen straight line, steam, 1" air outlet, cap. 70 ft. free air.
 8" x 6" upright, with direct connected 10 H.P., 110 volt National motor, capacity 50 ft. free air.
 8" x 6" Laidlaw-Dunn, single belt driven, 2" air outlet, cap. 51 ft. free air.
 7" x 15" x 10" Deane, single, steam, capacity 100 ft. free air.
 7" x 8" x 6" Worthington duplex, 1" outlet.

Blowers

60" No. 12 Sturtevant, outlet 36" x 36".
 63" Boston, outlet 17" diam.
 50" Buffalo pressure, outlet 12" diam.
 54" Sturtevant No. 8 Monogram, outlet 18" diam.
 51" Pittsburg, three-quarter housed.
 40" No. 6 Sturtevant, outlet 10" diam.
 43" No. 8 Buffalo, outlet 8" diam.
 40" No. 7 Champion blower, 11" diam.
 32" Allan, outlet 8" x 10".
 20" No. 3 blower, outlet 8" diam.
 Roots No. 2 rotary pressure blower, outlet 10" diam.
 Green No. 5 rotary pressure, outlet 10" diam.
 No. 2 upright Indianapolis rotary pressure blower, outlet 9" diam.
 63" Boston noiseless, outlet 13" diam.
 60" Ruble, two outlets 9" diam.
 60" American steel plate blower, outlet 20" x 20".
 56" Sturtevant, outlet 13" x 20".
 3-50" No. 7 Sturtevant Monogram, outlet 16" diam.
 No. 9B Wilbraham-Green pressure blower or exhauster.
 48" No. 7 Sturtevant Monogram, outlet 16" diam.
 42" No. 6 Sturtevant Monogram, outlet 14" diam., direct connected to 220 volt motor.
 30" No. 10 Buffalo pressure, outlet 12" diam.
 No. 4 Sturtevant.
 20" No. 3 Champion, outlet 6" diam.
 No. 6 Baker rotary, outlet 20" diam.
 No. 2 upright Indianapolis Blower Co. rotary pressure blower.

Direct Current Generators

100 K. W., 115 V., Gen'l Electric, multipolar, 600 R. P. M.
 100 K. W., 250 V., Westinghouse 6 pole, 550 R. P. M.
 100 K. W., 125 V., Edison.
 100 K. W., 500 V., Gen'l Electric, bipolar, 650 R. P. M.
 75 K. W., 110 V., 1500 light, Westinghouse.
 75 K. W., 500 V., 1500 light, Westinghouse.
 2-62 K. W., 550 V., Thompson-Houston, 900 R. P. M.
 60 K. W., 500 V., 1200 light, Edison bipolar, 825 R. P. M.
 60 K. W., 4 pole, 125 volt, 1200 light, Eddy, 850 R. P. M.
 60 K. W., 125 V., 1200 light, Edison bipolar, 825 R. P. M.
 60 K. W., 4 pole, 115 volt, 1200 light, Thresher, 600 R. P. M.
 75 K. W., 500 V., 1500 light, Westinghouse.
 60 K. W., 4 pole, 115 volt, 1200 light, Thresher, 600 R. P. M.
 45 K. W., 250 V., Edison bipolar, 1000 R. P. M.
 45 K. W., 125 V., 900 light, Edison bipolar, 1000 R. P. M.
 45 K. W., 125 volt, 900 light, Westinghouse.
 37 1/2 K. W., 110 V., 750 light, Continental bipolar, 950 R. P. M.
 40 K. W., 275 V., 800 light, Commercial multipolar, 880 R. P. M.
 40 K. W., 125 V., 800 light, Northern, 725 R. P. M.
 30 K. W., 220 V., 600 light, Ft. Wayne, 1050 R. P. M.
 30 K. W., 4 pole, 124 volt, 600 light, Hobart, 640 R. P. M.
 27 1/2 K. W., 110 V., 550 light, Lincoln, 780 R. P. M.
 22 1/2 K. W., 125 V., 450 light, Westinghouse "type M" multipolar, 975 R. P. M.
 30 K. W., 125 V., 600 light, bipolar Edison, 1200 R. P. M.
 30 K. W., 4 pole, 124 volt, 600 light, Hobart, 640 R. P. M.
 30 K. W., 125 V., Edison bipolar.
 30 K. W., 125 V., Edison bipolar, 1200 R. P. M.
 12 K. W., 110 V., 550 light, Lincoln, 780 R. P. M.
 12 K. W., 125 V., 240 light, Edison bipolar.
 12 K. W., 120 V., 240 light, Western, 4 pole, 650 R. P. M.
 3 K. W., 110 V., Westinghouse, 2200 R. P. M.
 2-6 K. W., 125 V., Wood, 1850 R. P. M.
 7 1/2 K. W., 125 V., 150 light, Eddy 4 pole, 1250 R. P. M.
 2-6 1/2 K. W., 125 V., Gen. Elec., 1875 R. P. M.
 4 K. W., 125 V., 90 light, Crocker-Wheeler, 4 pole, 1100 R. P. M.
 4 K. W., 198 V., Eddy, type G, 4 pole, 1175 R. P. M.

Alternating Current Generators

500 K. W., 2200 V., two-phase, engine type Westinghouse, 150 R. P. M.
 300 K. W., 1150 V., single-phase, 125 cycle, Westinghouse.
 2-200 K. W., 1100 V., 133 cycle, Fort Wayne.
 180 K. W., 2300 V., single-phase, 60 cycle, General Electric.
 4-120 K. W., 1150 V., single-phase, 125 cycle, Gen. Elec.
 120 K. W., 1100 V., single-phase, 133 cycle, Westinghouse.
 120 K. W., 1100 V., single-phase, 133 cycle, Westinghouse.
 90 K. W., 1150 V., single-phase, 125 cycle, Gen. Elec.
 90 K. W., 1155 V., single-phase, 125 cycle, Gen. Elec.
 70 K. W., 1100 V., single-phase, 125 cycle, Thompson-Houston.
 60 K. W., 1155 V., single-phase, 125 cycle, Gen. Elec.
 60 K. W., 2200 V., two-phase, 60 cycle, Westinghouse.
 60 K. W., 2200 V., single-phase, 125 cycle, Gen. Elec.
 60 K. W., 1050 volts, single-phase, 133 cy., Westinghouse, 1650 R. P. M.
 60 K. W., 1050 volts, single-phase, 133 cy., Westinghouse, 1650 R. P. M.
 40 K. W., 1050 V., Thompson-Houston.
 25 K. W., 1050 light, 1050 V., Thompson-Houston, 1500 R. P. M.
 15 K. W., 360 light, 1050 V., Thompson-Houston, 1500 R. P. M.

Drills

20" Silver upright drill, square base. NEW.
 18" Blaisdell upright drill.
 Silver No. 12 upright post drill. NEW.
 Silver No. 14 post drill. NEW.
 Silver hand post drill. NEW.
 Four spindle Western upright drill.
 Double spindle upright drill.
 Three spindle upright drill.
 60" Box semi-radial drill.
 36" Harrington upright back geared drill.
 25" post drill.
 3-24" Hoefler back geared upright drills. NEW.
 3-23" Hoefler back geared upright drills. NEW.
 2-21" Hoefler wheel and lever feed upright drills. NEW.
 18" upright drill.
 3-16" Hoefler lever feed upright drills. NEW.
 2-19" Hoefler upright drills, lever feed. NEW.
 No. 4 Hoefler friction driven bench drill. NEW.
 Dwight upright, double spindle, multiple drill.

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| No. 2 Beaman & Smith Horizontal Boring Machine, good as new, 3" Spindle. | 60 x 60 x 20' Fitchburg Planer. | Hendey Special Double Housing Suspension Scraper. |
| No. 11 B. & S. Plain Grinder. | Nicholson Horizontal Boring Head. | Erie Portable Keyseater. |
| 72" x 60" x 20' Fitchburg Planer, 2 Heads on Cross Rail. | Sellers Cylinder Borer. | Baush 8 Spindle Drill. |
| 36" x 36" x 7' Rich Planer, 1 Head on Cross Rail. | Colburn 53" Mill, 2 Heads, Plain Table. | 16-Spindle Horizontal Drill, P. & W. |
| N. Y. Flue Welders. | Putnam 42" x 13' Triple Geared Lathe. | 6-Spindle Quint Drill. |
| No. 0 P. & W. Screw Machine. | Putnam 42" x 17' Triple Geared Lathe. | Baush 8-Spindle Multiple Drill, 1" holes. |
| 4-Spindle P. & W. Nut Tapper. | 32" x 18" S. & B. Triple Geared Lathe. | 30" Gould Hand Gear Cutter. |
| Springfield Valve Surface Grinder. | Bement Single-Axle Lathe. | Portable Keyseater, Erie. |
| Roll Grinder, 22" x 30". Poole. | Sellers 28" x 12' Boring Lathe. | 800-lb. Morgan Steam Hammer. |
| 5' Betts Vertical Boring Mill. | 9" x 6' Plain Turning Lathe, P. & W. | 3" W. & R. Cutting-Off Machine. |
| | 12" x 4' Speed Lathe, Grabo. | 30" Sturtevant Exhaust Fan. |
| | Warner & Swasey Horizontal Drilling Lathe. | No. 0 Armstrong Pipe Machine, 2". |

ENGINES

1-55 H.P. Westinghouse Standard Engine, No. 4728, size 9½" x 9", regular fly wheel on one end of shaft and regular combination pulley and fly wheel on the other end; driving pulley, 27" x 12"; floor space required, 88" x 42" x 61" high. Rated at 55 H.P., 350 R.P.M., 100 pounds steam pressure. In perfect condition and requiring scarcely any adjustment.

1-14 H.P. Westinghouse Junior Engine, No. 2026, size 9" x 8", with standard fly wheel, governor wheel and pulley 16" x 12". Rated 44 H.P., 350 R.P.M., 100 pounds steam pressure. Floor space required, 70" x 36" x 68" high. In good condition; slight adjustment will place it in perfect running order.

These have been displaced by Electrical Equipment in the enlargement of our Bridgeport Factory, and are offered at a low price to insure their prompt sale.

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			Japan, Tokio		Mexico City, Mexico				

NEW AND NOT NEW

Partial List of Machines on Our Floor

NEW MACHINERY

- 11" x 5' Star.
- 1-13" x 6' Blaisdell.
- 1-7" x 6' Robbins.
- 1-16" x 10' Blaisdell.
- 1-18" x 10' Blaisdell.
- 1-32" x 16' New Haven.
- 2-- No. 2 American Tool & Mach. Turrets, plain and friction heads.
- 1-Smith & Mills 20" B. G. Shaper.
- Smith & Mills 24" Speed Box.
- 1-Potter & Johnston 24" Shaper.
- 1-16" x 16" x 42" Walter Bros.
- 1-17" Whitcomb Crank Planer.
- 1-17" x 17" x 4' Whitcomb Planer.
- 1-22" x 22" x 5' Whitcomb Planer.
- 1-24" x 24" x 6' Whitcomb Planer.
- 1-33" x 33" x 8' Ohio Planer, Two Heads.
- 1-4' Western Universal Radial
- 1-6' Western Plain Radial.

NOT NEW

- 16" x 6' Blaisdell Engine Lathe.
- 16" x 8' Flather Engine Lathe.
- 20" x 8' L. W. Pond Engine Lathe.
- 20" x 12' Bogart Engine Lathe.
- 24" x 12' Fifield Engine Lathe.
- 22" x 24" J. & L. Flat Turret Lathe.
- 28" Gisholt with 10 H. P. Motor.
- 24" x 12' American Turret Lathe.
- 20" x 12' P. & W. Turret Chucking Lathe.
- P. & W. Rev. Head Chucking Lathe.
- 6-spindle P. & W. Adjustable Drill.
- 8-spindle Baush Multiple Drill.
- 4-spindle Foote-Burt Drill.
- 5 ft. Niles Plain Radial.
- 1-Each, No. 1 and 2 B. & S. Vertical Chucking Machines.
- 60" Fitchburg Hor. Boring Mill.
- No. 2 Barrett Cylinder Boring Machine.

NOT NEW

- 15" Hendey Friction Shaper.
- 16" Phoenix Traverse Shaper.
- 15" Walcott Geared Shapers.
- 20" x 20" x 4 1/2' Sellers Planer.
- 22" x 22" x 5' Pease Planer.
- 27" x 27" x 7' Ames Planer.
- 36" x 36" x 16' Ohio Planer, 2 heads.
- 36" x 36" x 12' Flather Planer, two heads.
- 38" x 38" x 8' Gleason Planer.
- 39" x 32" x 16' Betts Planer.
- 48" x 44" x 12' Powell Planer, two heads.
- 72" x 64" x 27' Fitchburg Planer, 4 heads.
- No. 3 Plain Brainard Miller.
- No. 6 Plain Brainard Miller.
- No. 19 Kempsmith Miller.
- No. 2 Milwaukee, Universal.
- No. 26 Kempsmith, Universal.
- 130" Gould & Eberhardt Gear Cutter.
- 30" Gould & Eberhardt Gear Cutter.

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- 1-Vertical Air Receiver, 60" x 14' 6".
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- 2-65 H.P., No. 11, type 5, 500 volt Belted Generators, with Switchboard.
- 2-10" x 9" Westinghouse, Jr., Engines, 62 H.P.
- 16-Vertical Boilers, 20 to 40 H.P., complete with fittings.
- 50-Guy and Stiff Leg Derricks, 50 to 70', complete.
- 2-Snow Duplex Pumps, 10 x 7 x 10.
- 1-Snow Duplex Pump, 7 x 6 1/2 x 8.
- 4-Centrifugal Pumps, 8" suction, 6" discharge.
- 1-Centrifugal Pump, 6" suction, 4" discharge.
- 17-1-yard Dump Buckets.
- 3-1-yard Dump Buckets.
- 1-J. I. Case Traction Engine, 25 H.P.
- 1-Alfred Box & Co.'s 10-ton Holst Block.
- 1-Tranter & Davidson Gasoline Engine, 8 H.P.
- 1-75 H.P. Dick & Church Automatic Center Crank Engine.
- 4-61 x 10 Double Cylinder, Double Drum, Mounted Hoisting Engines, Mundy make.
- 2-51 x 10 Double Cylinder, Double Drum Mounted Mundy Hoisting Engines.
- 1-71 x 10 Double Cylinder, Double Drum Skele-ton Mundy Hoisting Engine.
- 4-10 x 16, 36" gauge, Baldwin Saddle Tank Locomotives, built in 1906.

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One Second-Hand Band Flywheel, 11' or 18' dia. x 32" or 36" face, 9" bore.

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STOCK TOOLS

For Working Plates, Bars and Shapes

SINGLE PUNCHES OR SHEARS

25-in. throat (new); 1-in. hole in 1-in. plate.
20-in. throat (new); 1-in. hole in 1-in. plate.
36-in. throat (new); 1 1/2-in. in 1 in.; shear 1-in. plate.

DOUBLE PUNCHES AND SHEARS.

25-in. throats (new) 1" in 1", shear 3/4" plate.

HORIZONTAL PUNCHES

12-in. throat; 1 5/16-in. in 1 1/2-in. plate (new).

12-in. throat; 1 1/16-in. in 1-in. plate (new).

GUILLOTINE SHEARS

17 1/2-in.; 2 1/2-in. round or 1 1/2 in. x 5 in. flats (new).

PLATE BENDING ROLLS

10 ft. 2 in., 9 1/2-in. top roll, 8-in. bottom rolls (new).

6 ft. 2 in., 6 1/2-in. top roll, 5-in. bottom rolls (new).

UNIVERSAL SPLITTING SHEARS

No. 0 Capacity 3/4 in. plate. Motor or pulley drive.

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6 in. x 6 in. x 1 in. Belt or motor driven (new).

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One pair 9 x 9 Taylor duplex vertical engines, second-hand, good order.

One 24 in. Powell gap boring lathe, swings 56 in.; second-hand; good order.

One Buffalo No. 10 Steel Pressure Blower, with 6 x 5 double cylinder double acting vertical Engine. Second-hand. Good condition.

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Second Hand No. 5 1/2
BAKER POSITIVE PRESSURE

BLOWER

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Scranton Stove Works
SCRANTON, PA.

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- 1 Mumford Air Squeezer, 44".
- 7 Farwell Moulding Machine.

Practically all new.

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One 70 ton Bucyrus 2 1/2 yd. Steam Shovel.
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Ten Standard gauge Petter 6 yd. Dump Cars, 1906 model.
All located at Duluth. Immediate shipment.
All condition.

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FOR SALE

3 pairs of Exhaust Tumbling Barrels, 32" x 24", egg shape, with stand complete. Made by the Stover Mfg. Co.
1-30 horse power White & Middleton Gas Engine, in good condition.

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Full equipment for small Tack Factory:
14 Tack Machines and Chopper, etc., etc.
Full particulars and price on application.

HENRY PERKINS CO.
Bridgewater, Mass.

For Sale, Cheap

We offer at about one-fourth original cost
One Hand Power Traveling Crane, made of structural steel. Built by Whiting Foundry Equipment Company. Span of Crane, 16' 6"; capacity, Four Tons. For further particulars and price address
CANONSBURG STEEL & IRON WORKS,
Canonsburg, Pa.

USED MACHINERY

IMMEDIATE DELIVERY

LATHES

- 1—54" x 20' New Haven.
- 1—48" x 18' Fitchburg.
- 1—42" x 20' American.
- 1—36" x 25' New Haven.
- 1—36" x 26' Putnam.
- 1—32" x 26' Niles.
- 1—26" x 12' Davis & Egan.
- 1—26" x 17' Putnam.
- 1—24" x 14' Fitchburg.
- 1—24" x 14' Union Machine Co.
- 1—21" x 8' Bradford.
- 1—18" x 12' Johnson.
- 1—16" x 6' Reed, with taper.
- 1—16" x 8' Fitchburg.
- 19 Smaller Lathes, various makes.

PLANERS

- 1—42" x 36" x 14' Am. Tool Works Co.
- 1—40" x 40" x 11' Putnam.
- 1—36" x 36" x 10' Pond Machine Tool Co.
- 1—32" x 32" x 14' Flather, Open Side Attachment.
- 1—36" x 30" x 8' Ohio Machine Tool Co.
- 1—26" x 26" x 8' Lodge & Davis.
- 1—25" x 25" x 8' Fitchburg.
- 1—24" x 24" x 5' Whitcomb.
- 1—22" x 22" x 5' Ames.
- 1—17" x 17" x 4' Whitcomb.

BORING MILLS

- 1—10'-16" Pond Machine Tool Co.
- 1—36" Bullard (old style).
- 1—No. 5 Binsse Horizontal.
- 1—No. 3 Meadville Horizontal.

DRILLS

- 1—5' Fosdick Radial Universal.
- 1—4' Gang, Plain, New.
- 1—3½' Gang, Plain, New.
- 1—3' Gang, Plain, New.
- 1—2½' Gang, Plain, New.
- 1—3' American, Plain.
- 1—4' Mueller, Plain.
- 1—4' Niles Half Universal.
- 1—36" New Haven, B. G.
- 1—36" Blaisdell, B. G.

SHAPERS

- 1—34" Walcott.
- 1—26" Walcott.
- 1—26" Lodge & Davis.
- 1—24" Flather.
- 1—24" Cincinnati.
- 1—24" Gould & Eberhardt.
- 1—20" Springfield.
- 1—16" Ohio.
- 1—15" Walcott.

MILLING MACHINES

- 1—No. 4 Brown & Sharpe, Plain, with Motor Drive.
- 1—No. 2 Putnam Universal.
- 1—No. 1 Cincinnati Universal.
- 1—No. 4 Garvin, Plain.
- 1—No. 5 Garvin, Plain.
- 1—No. 13 P. & W. New Model (Lincoln).
- 1—No. 1 Garvin (Lincoln).
- 1—No. 3 Garvin Hand Miller.
- 1—No. 2 Pratt & Whitney Hand Miller.
- 1—No. 0 Pratt & Whitney Hand Miller.

SCREW MACHINES and TURRET LATHES

Full stock of all standard sizes, new and second hand.

MISCELLANEOUS

- 1—Cleveland Single End Punch and Shear, 1½ x 1.
- 1—Style "G" Badger Punch and Shear, ¾ x ¾.
- 1—No. 4 Cincinnati Punch and Shear, ¾ x ¾.
- 1—No. 65-A Consolidated Power Press.
- 3—No. 3 Rudolph & Krummel Power Presses.
- 1—No. 4 Williams & White Bulldozer.
- 1—No. 5 Williams & White Bulldozer.
- 1—25-lb Bradley Helve Hammer.
- 1—40-lb Bradley Helve Hammer.
- 1—60-lb Long & Alstatter Helve Hammer.
- 1—80-lb Bradley Helve Hammer.
- 1—600-lb Automatic Drop Hammer.
- 1—2000-lb Morgan Steam Drop Hammer.
- 1—¾" Burdick Bolt Header.
- 1—1½" Acme Bolt Header.
- 1—2" Acme Bolt Header.
- 1—1½" Blakeslee Bolt Header.
- 1—1½" Blakeslee Bolt Header.
- 1—1½" Acme 6-Spindle Nut Tapper.
- 1—Sellers Wet Tool Grinder.
- 1—4" Hurlburt & Rogers Cutting OT Machine.
- 1—No. 4 48" Brown & Sharpe Aut. Gear Cutter.
- 1—42" Gould & Eberhardt Aut. Gear Cutter.
- 1—6" Burr Key Seat Milling Machine.
- 1—Prentice Suspension Drill.
- 1—40-ton Hydraulic Press, 5' between bars.
- 1—1" Hartford Automatic Screw Machine.
- 1—60" Peck, Stow & Wilcox Power Shear.
- 1—Pratt & Whitney Die Sinker.
- 1—No. 2 Mitts & Merrill Keyseater.
- 1—No. 15 Garvin Profiler.
- 1—No. 9 Jarecki Pipe Machine.
- 1—No. 7 Jarecki Pipe Machine.
- 1—6" Merrill Pipe Machine.
- 1—3" Putnam Bolt Cutter.
- 1—2½" National Bolt Cutter.
- 1—1½" Acme Bolt Cutter.
- 1—700-lb. Bell Steam Hammer.

The H. A. Stocker Machinery Co.

20-22 So. Clinton St.

CHICAGO, ILL.

Some Good Tools

AT

LOW FIGURES

- 1—36" x 36" x 20' Sellers Planer.
- 1—24" x 12' Bullard Lathe, triple geared.
- 1—17" x 8' Union Machine Co. Lathe.
- 1—42" Miles Car Wheel Borer.
- 1—Bement Six Spindle Nut Tapper.
- 1—10" Stroke New Haven Shaper.

Thos. P. Conard & Company
Harrison Building
PHILADELPHIA, PA.

LOCOMOTIVES

If interested see our ad

PAGE 71

This issue of this paper.

Davenport Locomotive Works
Davenport, Iowa

For Sale

One 150 H. P. Wetherill Corliss Engine, in good condition. Address "T. U. M." Room 1632, Commercial National Bank Building, Chicago, Ill.

WANTED

SECOND-HAND MACHINERY

- 10-Ton Locomotive Crane with one yard clam shell bucket.
- 22 to 25 ton 4-wheel locomotive, standard gauge, saddle tank, 6 to 7 ft. wheel base.
- 250-400 or 500 Horse-power Water Tube Boiler.

Give full particulars and location. Address "R. B." care *The Iron Age*, New York.

FOR SALE

300 tons of cast iron floor plates, 24 x 36, 1 inch thick, smooth surface, straight on sides.

MORRIS WEIL & SONS,
837 N. Third St., Philadelphia.

Wanted

Nail capping and double pointed tack machinery. Second-hand machines in good condition will be bought. Prompt delivery is required.

THE BAZIN MFG. COY.,
Quebec, Canada.

FOR SALE

Complete up to date line of Cast Iron Toy Patterns, all gated and in excellent condition. Also few thousand dollars' worth of orders and sales included. Increase other lines complete us to discontinue Toys. Address "IDEAL," care *The Iron Age*, Fisher Building, Chicago, Ill.

For Sale Cheap.

We will sell the following machinery at a bargain price to a quick buyer for cash

- 1—16" Baker Shaper, made by the Baker Tool Co., Cincinnati, O. New tool, used but one week.
 - 1—36" Hall & Brown Band Saw, complete with 3 blades, adapted for sawing either slate or wood. Second-hand machine, but in first-class condition.
 - 1—No. 2 American Gas Furnace. Second-hand, but in first-class condition.
- Address
MANUFACTURING DEPARTMENT,
WESCO SUPPLY COMPANY,
St. Louis, Mo.

FOR SALE

One S. A. Woods Machine Co. No. 8 24-inch timber starter, with jointer heads, knives, slotted grooves, belts, etc.

One 30-inch automatic knife grinder.

Above were made in 1904 and have had but a few months' service.

One 40-inch Sturtevant shavings exhaustor, left hand, bottom horizontal discharge, entirely new. Address

JOHN W. FERGUSON CO.,
152 Market Street, Paterson, N. J.

WANTED

Party with large capital to make and market in car lots a small Railway Steel de Ice, next in importance to air brake. Demand positive. This is a chance of a lifetime to manufacturers of extra large capital. Bank reference. 315 Young Street, Dallas, Texas.

SEND FOR NEW LIST No. 13

Second-hand MACHINERY

Lathes

11" x 3' 6" Pl. R.	26" x 14' Plain R., L. W. Pond.
14" x 6' R. & F., & Taper Fitchburg.	28" x 17' Plain R., L. W. Pond.
14" x 6' C. R., Fitchburg.	40" x 10' C. R., Stearns.
14" x 6' C. R. & Taper, Prentice	21" x 48" x 8' Gap, Harrington.
15" x 6' R. & F., Blaisdell.	35 ft. Pit Lathe.
16" x 6' C. R., & Taper, Fitchburg.	9" x 4' Washburn Speed Lathe.
16" x 6' R. & F. Blaisdell.	10" x 4' Bancroft Speed Lathe.
16" x 8' C. R. & Taper, Reed.	11" x 4' Automatic Speed Lathe.
18" x 8' Plain R., Wright & Powell.	15" x 6' Blaisdell Speed Lathe.
18" x 10' Plain R., Wright & Powell.	16" x 10' Hand Lathe.
20" x 12' R. & F., Putnam.	20" x 12' Hand Lathe.
26" x 12' Plain R., L. W. Pond.	24" x 14' Hand Lathe.

Railroad Tools

48" 300 Ton Wheel Press.	24" Bement Drill.
48" 150 Ton Wheel Press.	Bement Single Axle Lathe.
36" Bement Car wheel Borer.	Bement Double Axle Lathe.
	Niles Double Axle Lathe.

Turret Machinery

No. 0, 3/8" P. & W. Wire Feed.	No. 1 Sing. Turret, Spencer Auto.
No. 1, 1/2" P. & W. Wire Feed.	No. 1 D'ble Turret, Spencer Auto.
No. 2, 3/8" P. & W. Wire Feed.	No. 2 Sing. Turret, Spencer Auto.
No. 2 1/2, 1" P. & W. Draw-lack.	No. 2 D'ble Turret, Spencer Auto.
No. 2 1/2, 1 1/8" Fri. Hd. P. & W. Wire Fd.	No. 4, 1 9-16" Bardons & Oliver, W. F.
No. 3, 1 1/8" Fric. Hd. P. & W. Plain	No. 2 1/2, Auto. Hartford, P. & W.
No. 00 Auto., Hartford.	No. 2, 3/8" Turning Mch., Cleveland.
" 0 " "	24" Conradsen Turret Lathe.
" 1 " "	24" Gisholt Turret Lathe
" 2 " "	
" 3 " "	

Boring Mills, Planers and Shapers

9" Sellers Trav. Head Shaper.	26 x 26 x 16 Bement, 2 hds.
12" Miles Trav. Head Shaper.	30 x 30 x 24 Sellers, 2 hds.
18" Cincinnati Dbl. Head Shaper.	30 x 36 x 20 Sellers, 1 hd.
16" B. G., Crank, Niles.	48 x 48 x 9 Hughes & Phillips, 1 hd.
12 x 17 x 17 Crank Planer.	48 x 48 x 30 Fairbanks, 1 hd.
Whitcomb.	72 x 72 x 24 Sellers, 4 hds.
16 x 16 x 4 P. & W. Planer.	72 x 72 x 24 Bement, 3 hds.
17 x 17 x 4 Whitcomb Planer.	84 x 48 x 20 Hughes & Phillips, 2 hds.
20 x 20 x 4 N. Y. Steam Eng. Co. Planer.	30" Vertical Mill, B. & S.
25 x 25 x 6 Bement Planer.	21" Vertical Mill, Pond.
26 x 26 x 6 Pond, 1 hd.	Spec. Horiz. Cyl. Bor. Mch.
	2" bar Horiz. Mill, Kelley.

Drills

13" Sensitive Motor, Hill Clark.	9" Bench, P. & W.
24" Upright Motor, Hill Clark.	10" 2-sp. Slate.
24" Vertical, Bement.	10" 3-sp. Slate.
32" Vertical, Pond.	14" 3-sp. Gang, Hendey.
21 1/2" Radial, Hilles & Jones.	14" 4-sp. Gang, Garvin.
3" Radial, Hilles & Jones.	17" 4-sp. Gang, J. & L.
4" 6" Radial, Hilles & Jones.	14" 6-sp. Sens., Foote-Burt.
6" Radial, Univ. Miles.	10-sp. Type H., P. & W. Motor.

Milling Machines and Grinders

No. 0 Plain, Carter & Hakes.	No. 1 Single Sp. Profiler, P. & W.
No. 1 Plain, Garvin.	8" Bench Grinder.
No. 2 Plain, all feeds & vert. att., LeBlond.	Cutter Grinder, Garvin.
No. 2 Univ. Cincinnati.	Univ. Cutter Grinder, Cincinnati.
No. 12 Plain, Brown & Sharpe.	18 in. Wet Tool Grinder, Stiles.
No. 2 Lincoln, P. & W.	24 in. Wet Tool Grinder, Barnes.
Small Hand Miller, Garvin.	110 V. Hisey-Portable Parallel Grind.
Small Index Miller, Brainard.	No. 6 Blount Buff.
Single-Sp. Profiler, Garvin.	

Miscellaneous Machinery

Small Screw Slotter.	Spiral Spring Winder, Shuster.
100 lb. Compact Hammer, Bradley.	5 HP. 110 V. Con. Speed Motor.
300 lb. Drop Hammer, Blundell.	7 1/2 HP. 110 V. Con. Speed Motor.
2" Pipe Machine.	110 V. Edison 40 Light Dynamo.
1" x 16" Bending Rolls.	
1" x 3/8" capacity, Bement Horiz. Punch.	

Miscellaneous Department.

Niles-Bement-Pond Company

111 Broadway, New York City.

2nd Hand Machinery

For Immediate Shipment.

BOLT CUTTERS

Acme, 1 1/2 in., with quick opening die head.
Back geared cutter with Q. O. die head.
Double head bench bolt threader.
Bolt cutter, back geared, Olds make.

BRASS FINISHERS' MACHINERY

No. 0 American valve miller.
No. 2 American cabinet turret, 17 in. sw.
16 x 5 ft. Bridgeport Universal pl. hd. Fox turret.

16 x 6 ft. American bk. gd. Fox turret.
15 x 5 ft. Buckeye turret friction, Gd. Hd.
13 x 4 ft. American lathe.
14 x 5 ft. speed lathe, dovetail S. O.
No. 3 Pratt & W. Fr. Gd. Hd. turret, 16 x 5 ft.
14 x 3 ft. Jones & Lanson plain hd. turret.
18 x 6 ft. Hendy plain head turret.
12 in. turret screw machine, 1 in. hollow Sp. Garvin screw slotter.
16 in. Warner & Swasey turret screw machine.
15 x 4 ft. Jones & L. fric. geared turret.

SHAPERS

10 in. stroke traveling head crank shaper.
12 in. stroke crank shaper.
12 in. Hendy geared rack shaper.

MILLING MACHINES

No. 1 Lodge & D. plain back gear.
No. 14 Brainard Universal.
Brown & Sharp Universal, table 5 x 28 in.
Reed Miller, table 9 x 24 in.
No. 1 American 2 spindle valve miller.

DRILLS

10 in. sliding head sensitive bench.
10 in. Dwight-Slate bench sensitive.
11 in. friction disk on column.
13 in. No. 1 Acme sliding head sensitive.
14 in. Woodward & R. sensitive sl. hd.
14 in. Dawson & G., sliding head.
20 in. bench, W. & S. feed.
20 in. on column, sliding head.
21 in. bench sliding head.
26 in. Phillips, bk. gd. slid. head.
26 in. stationary head, bk. gd.
52 in. back geared.
No. 3 Garvin 4 spindle sensitive.
No. 2 3 spindle sensitive.
Four spindle Woodward & R. sensitive.
12 in. 3 spindle on column.

MISCELLANY

48 in. Harrington vertical boring mill.
48 in. Bement & D., vertical boring mill.
Centering machine 10 in. swing 4 ft. bed.
Grinder. Brown & Sharp, 13 x 4 in.
Metal saw table, iron frame.
Bench tapping machine.
Trussed cornice brake 8 ft.
Brass melting furnace.
Valve reseater cap, 1/4 to 6 in. valves.
Power slitting machine, 16 1/2 in.
Cutter grinder, Pratt & Whitney.
Roll forming machine, 3 rolls.
Price and full detailed description with cut or photo furnished on application.

C. C. WORMER MACHINERY CO.

85-89 W. Woodbridge St., Detroit, Mich.

DON'T

Quit Looking Until

You have scanned the List on
Page

105

SPECIAL BARGAIN

Two Bement equivalent No. 13 Brown & Sharpe Milling Machines. Price, \$150.00 each—Immediate delivery.

JOHN W. COLE,
Providence, R. I.

WANTED

Direct connected Engine and Generator:
Generator to be from 60 to 75 K.W., 220 volt, direct current. Must be in good shape. State make and size of engine and generator. Delivery before October 1st.

INGERSOLL MILLING MACHINE CO.,
Rockford, Ill.

McDowell, Stocker & Co.

SECOND-HAND MACHINERY

1—No. 17 Foote-Burt Multiple Spindle Drill with two heads on the rail. Practically new. 140 ft. between outside uprights.

1—60 in. W. P. Davis Pulley Lathe. New.

2—2 in. x 24 in. Jones & Lamson Turret Lathes with outfit "D".

1—36 in. x 14 ft. Putnam Engine Lathe with blocks to swing 42 in. Plain rest.

1—48 in. New Haven Drill Press S. H. and P. F. and B. G.

1—42 in. Bement-Miles Double End Car Wheel Lathe. Second-hand. Good order.

1—24 in. x 24 in. x 6 ft. Shelbyville Planer. Good order.

1—50 in. G. & E. Automatic Gear Cutter, spur gears only. Fine working order.

1—1 in. Burdick Bolt Heading Machine for square and hexagon head bolts. Fine order.

1—24 in. x 26 ft. Shafting Lathe, C. R., 22 ft. bet. centers. Complete, fine order.

1—No. 0 Brown & Sharpe Automatic Screw Machine. Fine condition.

1—No. 00 Brown & Sharpe Automatic Screw Machine. Fine condition.

1—No. 3-A Becker Profiling Machine. Fine condition.

6—American Watch Tool Lathes. Fine condition.

It will pay you to send for the latest issue of the *Machinery Buyers' Guide*, a new kind of machine tool list.

McDowell, Stocker & Co.

59-61 So. Canal Street
CHICAGO, ILL.

Milwaukee Office, Room 51, Loan & Trust Bldg.
Grand Rapids, 113 Michigan Trust Bldg.

Denver Branch, P. O. Box No. 4062.
Indianapolis, P. O. Box 132.

SECOND-HAND MACHINERY

For Immediate Delivery

BORING MILLS.

30" Niles Turret.
37" Baush & Harris, 2 heads.
84" Sellers, 2 heads.
10" Niles, 2 regular, 1 boring head.
Sellers Horizontal Cylinder, 6" boring bar.

DRILL PRESSES.

14" Allen Sensitive.
18" Prentice, wheel and lever.
20" Barnes, lever feed.
24" Drill, Sl. Hd., Heavy Pattern, 46" vert. feed, 3 3/4 spdl.
28" Hamilton, Sl. Hd., B. G., P. F., Auto stop.
38" Back Geared Heavy Drill.
4 1/2" Bickford Plain Radial.
No. 0 Bickford Radial, swing table, tapping.

GEAR CUTTERS.

22" Gould & Eberhardt Hand.
24" Gould & Eberhardt, Spur and Bevel.
30" Gould & Eberhardt, Spur only.
60" Gould & Eberhardt, new.

LATHES.

18 x 6 Lodge & Davis, comp. rest, hol. spdl.
18 x 8 Lodge & Baker, plain rest.
10 x 14 Hamilton, quick change gear, hexagon turret.
20 x 14 Sebastian, plain rest, hol. spdl.
20 x 10 American Geared Head Reducing Lathe.
28 x 25 Fitchburg, compound rest.
30 x 18 New Haven, comp. rest.
36 x 21 Putnam, compound rest.
48 x 30 Fiffeld, triple geared, comp. rest.
60" New Haven Pulley Lathe.

MILLING MACHINES.

No. 2 Garvin Universal.
6 No. 0 Brown & Sharpe Plain.
2 No. 2 Brown & Sharpe Plain.
No. 4 Garvin Plain.
3 No. 3 1/2 Fox Power Feed.
3 No. 1 Brown & Sharpe Plain.
No. 2 Hendy Universal, all feeds.
No. 1 1/2 Cincinnati Universal.
No. 1 1/2 Hendy Plain, Back Geared.
TURRET AND SCREW MACHINES.

48" Gisholt Turret Lathe.
18" Lodge & Baker Turret Lathe.
14" Lodge & Baker Turret Lathe.
1" Spencer Automatic Screw Machine.
2 1/4" Cleveland Automatic Screw Machine.

PLANERS.

26 x 26 x 6 New Haven, 1 head.
32 x 32 x 6 Gray, 1 head.
56 x 48 x 15 Sellers, 3 heads.
57 x 57 x 17 Sellers, 2 heads.

SHAPERS.

15" Walcott.
16" Steptoe.
24" Gould & Eberhardt.
24" Plather, revolv. table, P. F. to head.
26" Cincinnati Geared Shifting Belt.
Fellows Rack Cutting Shaper.

MISCELLANEOUS.

Gleason Cutter and Reamer Grinder.
Pond Single Head Axle Lathe.
Hilles & Jones Vertical Cutting-Off Machine.
24" Morton Portable Slotter.
24" Niles Slotter.
14" Stroke Traveling Head Shaper.
1 1/2" Bailey Keyseater.
1 1/2" National Bolt Cutter.
Garvin Chucking Lathe.

MARSHALL & HUSCHART

MACHINERY CO.
62-64-66 So. Canal St., Chicago, Ill.
109 Kentucky Ave., Indianapolis, Ind.
908-910 N. Second St., St. Louis, Mo.

Large Band Wheel

For Sale

18" in diameter, 53" face, 16" bore; double arm.

Large Lathe

38" swing, 30" bed "Fiffeld," with 30" four Jaw Chuck fitted.

Wm. C. Johnson & Sons Machinery Co.,
210 & 212 Washington Ave., St. Louis, Mo.

Second-Hand Bargains

2-250 H.P. Cahall Vertical Water Tube Boilers.

1-Long & Alstatter No. 4 Double End Punch Shear.

1-Williams & White Eye Bolt Bender.

2-60 K.W. Fort Wayne 125 volt Generators, with switchboard instruments, belts, etc.

2-150 H.P. B. & W. Boilers, F.O.B. Washington, D. C., \$1200.

1-McMyler Locomotive Revolving Crane.

New Electric Traveling Cranes, Locomotive Cranes, Steam Pumps, Turbine Pumps, Punches, etc.

H. J. KOONTZ,

723 Bessemer Bldg., Pittsburg, Pa.

FOR SALE

BOILERS.

1-Berry Boiler, 150 H.P., good for 150 lbs. steam. First-class condition.
1-Erie City Economic Portable Boiler, 60" in diameter, length over all 14', 100 H.P., good for 100 lbs. of steam, complete with 35' stack and fittings.

ENGINES.

1-Nagle Rolling Mill Engine, left hand, 18" x 27".
1-Vertical Nagle Engine, 10" x 10". Fly wheel 10" x 48".
1-12" x 20" Right Hand, Plain Slide Valve, has 8" x 14" fly wheel, 30" x 14" pulley.
1-12" x 24" Right Hand Slide Valve Engine, 8" x 14" face, Solid fly wheel.
1-Standard Gauge Locomotive, with tender; weight 42,500 lbs., wheel base 5' 9", diameter drivers 40", steam cylinder 12", stroke 18".

HOISTING ENGINES.

1-7" x 10" Mundy Improved Friction Double Cylinder Double Drum Hoisting Engine, complete with 42" x 8" Boiler. Has extra nigger-head.
1-Lidgerwood Electric Hoisting Engine, double drum, double friction, operated by 61 Horse Power General Electric Motor. Drums 50" in diameter; one nigger-head. First-class condition.

COMPRESSORS.

1-Knowles 14 x 24 x 24 Single Blowing Engine, 490 cu. ft. free air per minute. Suitable for pressure from 5 to 15 lbs.

PUMPS.

3-Dean Brothers Duplex, 12 x 8 1/2 x 12", 6" suction, 5" discharge.
5-Dean Brothers Single, 10 x 8 x 12, 6" suction, 5" discharge.
1-Snyder Duplex Pump, 7 x 8 x 6.
1-Laidlaw-Dunn-Gordon, 4 1/2 x 2 1/2 x 4.
Also a large stock of other sizes and makes.

STACKS.

1-Heavy Stack, 5' in diameter, 85' high, good condition, and other stacks, almost any diameter and length.

IRON WORKING MACHINERY.

1-Doubling Sheet Shear, made by the Union Foundry & Machine Company, Pittsburg, 40" blade. Good as new.
2-"Wiley" (motor driven) Wet Tool Grinders.
1-Niagara Lever Punch.
1-No. 14 Buffalo Shear.
1-Size O Caskey Pneumatic Punch.
1-Portable Drill.

WOOD WORKING MACHINERY.

1-13" swing x 6' bed Atlantic Works Wood Turning Lathe.
1-Rowley & Hearnance Bilnd Stile Mortiser.
1-No. 175 Berlin Machine Works Double Surfacers Planer, planes 27" wide.

BLOWERS.

1-Boston Blower Company's No. 8 Blower.
2-No. 6 Sturtevant Monogram Exhaust Blowers.
1-No. 6 Cupola Blower, Sturtevant.
1-No. 7 Monogram Blower, Sturtevant.
All of the Sturtevant blowers are direct connected motor driven.

FRANK SAMUEL,

Harrison Building, Philadelphia, Pa.

FOR SALE

4 INCH PIPE MACHINE

A semi-automatic machine; been used 6 months; an unusual bargain; full set of dies.

Liberty Machinery & Supply Co.
95 Liberty St., New York City.

For Sale

1 Knowles Duplex Steam Pump (new); 20 in. steam cylinders, 14 in. water cylinders by 12 in. stroke.
700 ft. 30 in., 36 in. and 40 in. Cylinder Boiler Shells.

WE PURCHASE AND DISMANTLE OLD PLANTS

J. H. McClure & Son
202 Walnut Place,
Philadelphia Pa.

IMMEDIATE DELIVERY

Second-hand American Turret Lathe, A-1 condition, with an equipment of tools.

THOMAS & IOWE MACHINERY CO.
PROVIDENCE, R. I.

Second Hand Machinery

LATHES

16" x 6' Pratt & Whitney Plain Turret.
2-18" x 6' New Haven Lathes.
4-20" x 8' Enterprise Lathes.
24" x 12' New Haven Lathe.
20" x 18' L. W. Pond, cpd. rest and chuck.
26" x 12' Perkins, cpd. rest and chuck.

PLANERS AND SHAPERS

15" Steptoe Single Gear Crank.
18" Juengst Horizontal Lever Crank Shaper.
28" Juengst Horiz. Lever Crank Shaper.

DRILLS

16" Silver Post Drill, 3 step cone and counter-shaft.
16" Silver Post Drill, tight and loose pulley.
28" Bickford Upright Drill.
No. 2 3-spindle Garvin Gang.

PLATE WORKING

Lennox Power Rotary Splitting Shear, cap. 1" throat 30".
Fischer Bending Rolls, cap. 1" plate, 60" wide.
No. 65 W. C. Young Mfg. Co.'s Hand Power Lever Punch, 1" in 1" throat 7".
No. 5 W. C. Young Mfg. Co.'s Hand Power Shear, cap. 1" plate.

WOOD WORKING

AND CARRIAGE SHOP EQUIPMENT
Bailey Rounder and Chamfering Machine.
Moyer Hub Boring Machine.
Chuck and Tenoning Machine.
Rodgers Sash Tenoning Machine.
No. 4 Rodgers Med. Mortiser, with boring attachment.
4" Four-Sided Smith Moulder.
No. 3 Shimer Single Spindle Shaper.

BLOWERS

No. 000 Buffalo Steel Pressure, 5" outlet.
18" Buffalo Steel Pressure, 4 1/2" outlet.
12" Buffalo Steel Pressure, 3 1/2" outlet.
No. 9 Buffalo Steel Pressure Upper Vertical, 10" outlet.

MISCELLANEOUS

13" Reliance Single Bolt Cutter.
100 lb. Post Steam Hammer.
300 lb. Fox Steam Hammer.
1500 lb. Chambersburg Double Frame Steel Makers' Steam Hammer.
25" x 25" x 11 1/2" Sellers Horiz. Spindle Slab Miller.
36" x 14" P. & W. Horiz. Double Head Boring Mill.
No. 2 Baker Brothers' Keyseater.
No. 2 Mitts & Merrill Keyseat Milling Machine.
2" Eaton, Cole & Burnham Pipe Machine.
4" Saunders Pipe Machine.
4" Armstrong Hand Power Pipe Machine.
12" Lowell Machine Co.'s Slotter.
14" Schlenker Double Head Bolt Cutter.

BROWN & ZORTMAN MACHINERY COMPANY,
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Berryman Heaters

We have a few Berryman Heaters taken in trade and rebuilt, For Sale Cheap.

Every heater is tested and guaranteed as good as new Get our prices.

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120 Liberty St., New York.
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FOR SALE

For Immediate Shipment

Three (3)—150 horse-power Berry Boilers, 150 lbs. pressure each.
Two (2)—100 horse-power Erie City Economic Boilers, 100 lbs. pressure.
One (1)—50 horse-power Erie City Economic Boiler, 100 lbs. pressure.
Two (2)—78 x 13 Horizontal Return Tubular Boilers, 100 lbs. pressure.
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Upright Boilers from four (4) to fifty (50) horse-power.

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One (1)—20 horse-power Huber Traction Engine and Boiler, 100 lbs. pressure.

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One (1)—7 x 10 double cylinder, double drum, Mundy Hoisting Engine and Boiler.
One (1)—7 x 10 Williamson Spur-Gear Dock Hoisting Engine and Boiler.
One (1)—8 x 12 Spur-Gear Dock Hoisting Engine and Boiler.

Both of the above Hoisting Engines are equipped with double cylinders; each engine has two (2) drums.

STEAM PUMPS.

One (1)—12 x 18½ x 7½ x 10 Worthington Compound Pump.
One (1)—14 x 10 x 12 Dean Duplex Pump.
One (1)—12 x 12 x 12 Dean Duplex Pump.
One (1)—16 x 14 x 14 Blake Single Acting Pump.
One (1)—10 x 8 x 12, Dean Single Acting Pump.

FEED WATER HEATERS.

One (1)—500 horse-power I. B. Davis.

BLOWERS.

One (1)—No. 7 Wilberham-Green Blower, direct connected.
One (1)—Green Blower, 55 cu. ft. capacity, direct connected.
One (1)—Wilberham Blower, 45 cu. ft. capacity, direct connected.
The above Blowers are direct connected by steam engines.
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Two (2)—No. 6 Sturtevant Exhaust Blowers, direct connected by 470 volt motors.
One (1)—No. 6 Sturtevant Cupola Blower, direct connected by 470 volt motor.
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One (1)—No. 2 Root Positive Blast Blower.
One (1)—60 inch Sturtevant Steel Plate Exhaust Blower.

STEAM SEPARATORS.

1—10 inch Simpson Steam Separator.
1—8 " " " " " "
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1—8 " Cochran " " "
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Iron Tanks, all sizes.

We carry 250 to 300 tons of first-class Wrought Iron Pipe, sizes from 1" up to 12"; also a large stock of Smoke Stacks and Boiler Shells from 12" up to 60" diameter.

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Send us list of your requirements.
We buy and dismantle large plants.

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Six Vertical Tubular Boilers, 200 H. P. Each
8 feet, 9 inches diameter.

17 feet, 3 inches high.

219—2¼ inch tubes.

½ inch shell.

Corliss Steam Engine Works, makers.

In first-class condition—would make excellent waste heat boilers.

Immediate shipment.

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Stock continually changing; let me know your wants.

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72" x 54" Davis Triple Geared.
42" x 12" Putnam.
36" x 12" Putnam, rod feed.
32" x 12" Nicholson & Waterman
32"-58" x 16" Gap Lathe.
30" x 14" Fitchburg.
30" x 12" Betts.
24" x 14" Betts.
24" x 12" Fitchburg.
22" x 12" Betts.
19" x 8" Pond.
19" x 6" Pond.

NEW LATHES

18" x 10" Rahn-Carpenter.
18" x 8" Rahn-Carpenter.

PLANERS

42" x 42" x 18" Fitchburg.
38" x 38" x 10" New Haven.
37" x 33" x 10" Bement.
26" x 26" x 6" Bement.
20" x 20" x 5" Bement.
20" x 20" x 4" Sellers.

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24" Gould & Eberhardt, latest type.
14" x 34" Bement, Treverse, Two Tables.
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13" x 22" English, One Table.

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66" Wall Drill.
42" Betts Radial.
28" and 32" New Aurora Drills.

MISCELLANEOUS

P2 and P3 Ferracute, New.
No. 45 Crosby Press.
No. 6 Farrel Foundry, Double Acting.
No. 2 Fowler Press.
No. 41 Bliss, Double Acting.
No. 2 Hilles & Jones Bar Shear, engine driven.
60" Harrington Vertical Boring Machine.
36" Bridgeport Boring Mill.
No. 2 Espen-Lucas Floor Boring, Drilling and Milling Machine.
850 lb. Bement Steam Hammer, single frame.
Two Spindle Pratt & Whitney Profiler.
500 lb. Drop Press, Peck Lift.
600 lb. P. & W. Press.
50 lb. Little Giant Drop Hammer.
36" Sellers Horizontal Boring Machine.
4½" Burr Shaft Key-seater.
10" Lowell Slotter.
10" New Haven Slotter.
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Bardons & Oliver Fox Monitor, No. 3.
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Photographs and Specifications on application. Hundreds of other Tools. Full stock of New Drills, Lathes, Shapers and Planers. Largest Assortment of Boilers and Engines, Dynamos, Wood-Working Machinery and General Supplies.

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First-class MACHINE TOOLS

Immediate Delivery

42" x 42" x 14" L. W. Pond Planer, almost new.

48" x 48" x 20" Putnam Planer, two heads.

24" x 8" Jones & Lamson Heavy Turret Chucking Lathe. 3" hollow spindle.

4" Saunders Pipe Machine, almost new.

3¼" Acme Single Head Bolt Cutter, almost new.

5' Arm Niles Half Universal Radial Drill.

7' Pond Vertical Boring Mill with slotting attachment.

5' Niles Pulley Boring Machine.

Send for complete list. Good Tools only.

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SHOVEL MACHINERY

Complete equipment for making Plain Back, Hollow Back, and Riveted Back Shovels, Spades and Scoops, including Dies, Cutters, Punches, Molds, Gauges, Small Tools, Patterns, &c. All in good order. Address "SHOVELS," care The Iron Age, 1515 Real Estate Trust Building, Philadelphia, Pa.

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(1) 12-spindle multiple.

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(1) 200-lb. Mossberg & Granyille.

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(1) 26" Lodge & Davis Pulley Lathe.
(1) 30" x 12" Lodge & Davis.
(1) 36" x 16" H. C. Fish, B. G.
(1) 36" x 20" American Triple Geared.
(1) 45" x 20" New Haven Triple Geared, raising blocks to 51".

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(1) No. 4 Brown & Sharpe Plain.
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PLANERS.

(1) 16" Crank Planer.
(1) 22" x 22" x 4" Powell.
(1) 26" x 26" x 10" Powell, 2 heads.
(1) 30" x 30" x 8" Flather, 2 heads.
(1) 42" x 42" x 12" Pond, 2 heads.
(1) 58" x 48" x 16" National, 1 head.
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SHAPERS.

(1) 20" Gould & Eberhardt.
(1) 24" Walcott Shifting Belt.
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MISCELLANEOUS.

(1) 24" American Turret Lathe.
(1) 44" Gould & Eberhardt Spur Gear Cutter (Heavy Pattern).
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(1) 18" Morton Keyseater.
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(1) 15" Lowell Slotter.
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For Sale

1—Hawley Down Wrought Boiler and Trimmings, 17" x 5".
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1—Imperial No. 10 Compound Rand Ingersoll Compressor.
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1—Large Riveter (Peddick & Ayer), Allen riveters, 8½" cyl.
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1—G. E. Generator, 100 Kw., 500 V.; 210 Amp.
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4—Motors, 10 H.P. each, speed 800-500 Volts.
1—Armature, newly bound.
19—G. E. Enclosed Arc Lamps and Spare Parts for Arc Lamps.
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2—Hilles & Jones No. 3 Horizontal Punches, 12".
1—Hilles & Jones No. 3 Horizontal Punch, 32".
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For Immediate Delivery, Three Compound Tables

for use in connection with any make of Upright or Radial Drill.

2—18 x 24".
1—22 x 26".

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150F-18" x 8' S. & B. Lathe, st'd.
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152F-24" x 12' S. & B. st'd.
153F-24" x 14' S. & B. quick change.
154F-24" x 16' S. & B. st'd.
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156F-24" x 18' S. & B. quick change.
157F-24" x 18' S. & B. st'd.
158F-24" x 18' S. & B. quick change.
159F-24" x 18' S. & B. st'd.
160F-24" x 18' S. & B. quick change.

DRILLS

137F-48" Dresser Simplex Radial.
139F-4" Prentice Radial, gr. speed change.
125F-4" Univ. Rad. Drill Co. Full Univ. Radial.

PLANERS

126F-20" x 20" x 5' Pratt & Whitney, one head.
2538-30" x 30" x 7' New Haven, one head.
2537-52" x 44" x 12' Cincinnati, one head.

MISCELLANEOUS

2503-37" Niles Vert. Boring Mill, two heads.
132F-Bliss No. 10 Incl. Press.
116F-Ingersoll Duplex Steam Driven Air Compressor, air cylinder 18", steam cylinder 12", stroke 12", capacity 416 cu. ft., 25 to 40 lbs. air pressure.

SECOND-HAND DEPARTMENT
BAIRD MACHINERY COMPANY
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in

2nd-Hand Machinery

One 38" x 38" x 16' New Haven Planer, new Bull Wheel and Gears. First-class order.
One 42" x 12' Engine Lathe. Fair order.
One No. 3 Garvin Miller. Good order.
One 20" Davis Plain Drill. Fair order.
One 30" Berlin Double Drum Sander.
Two 6" B. & P. Crank Shapers.
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All of our second-hand machinery thoroughly overhauled and put in first-class order.

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FOR SALE

Will turn pulleys 30' diameter, 9' wide, very heavy and powerful. In excellent condition. Write for particulars and price.

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Two No. 24 Incl. weight 2300 lbs., fly wheel 32" x 5".
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Manville Geared Toggle, weight 8000 lbs., 20" between uprights.
Also several second-hand presses and sheet metal tools.

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Here are a few of our SECOND-HAND BARGAINS.

1-36 in. x 30 in. x 10 ft. Bement Miles Planer.
1-37 in. x 32 in. x 8 ft. N. Y. Steam Engine Co. Planer.
2-No. 2 B. & S. Milling Machines.
1-36 x 28 x 10 Putnam Planer.
1-36 x 16 S. & B. D. B. G. Lathe. New.
1-No. 0 B. & S. Milling Machine.
1-36 in. x 38 ft. Putnam Engine Lathe.
1-36 ft. Bickford Radial.
1-38 in. New Haven Mfg. Co. Drill Press.
1-34 in. Cincinnati Drill Press.
1-No. 4 Pearson Screw Machine.
2-No. 3 R. & K. O. B. J. Presses.
1-Platt Horizontal Vacuum Pump.
4-No. 0 R. & K. Power Presses.
1-3 Spindle Drill, B. F. Barnes.
1-No. 2 B. & K. S. Dbl. Crank Press.
1-Davis & Egan Miller.
1-2 in. B. & K. Pipe Machine, P. D. Q.
1-6 in. Curtis Pipe Machine.
48 in. Newton Slotter.
1-12 in. Slotter.
No. 2 Mechanics Friction Drill.
3-No. 2 B. & S. Automatic Screw Machines.

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-80 lb. Bradley Hammer, Cushioned Helve.
-37" Capacity Alligator Shear.
1-15 ton Post Jib Crane.
1-No. 5 Williams White Bulldozer.
1-No. 4 Williams White Bulldozer.
1-37" Acme Upsetter. Cast steel bed.
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The above tools are all in first class condition.

W. R. Beatty Machinery & Equipment Co.,
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42" x 12" Paisley Lathe.
22" x 8" Cyclone Lathe.
15" x 6" Speed Lathe.
14" x 5" Fox Lathe.
12" x 5" Speed Lathe.
16" Juengst Shaper.
No. 2 P. & W. Lincoln Miller.
20" Drill Press.
Colburn Universal Saw Bench.
Beech Jig Saw.
24" x 6" Surface Planer.
And other second-hand and new tools.

Write us your wants.
Frevort Machinery Company
18 DEY ST., NEW YORK

FOR SALE

One Pond Planer

IN FIRST-CLASS ORDER.

42 x 42 x 12 Ft.

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Machine Work Wanted

If you are crowded with work, we can place at your service between 15 and 20 skilled mechanics with all the equipment necessary to turn out work at short notice.

Drilling, reaming, grinding, tapping or polishing our specialty.
We will be pleased to submit prices.
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Second-hand cut washer machines up to 1 1/4". "S. S." care The Iron Age, New York.

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20 x 8' Wood & Light Engine Lathe, Plain Rest.
21 x 6' Fifield Engine Lathe, Comp. Rest and P. C. F.
22 x 8' Prentiss Engine Lathe, Comp. Rest and P. C. F.; 2" Hollow Spindle.
28 x 16' New Haven Engine Lathe, Comp. Rest and P. C. F.
16 x 16 x 4' Hendey "Tool Room" Planer.
20 x 16 x 3' Phoenix Planer.
80 x 28 x 10' Putnam Planer.
32 x 32 x 8' Pond Mch. Tool Co.'s Planer. Two Heads.
42 x 42 x 7' Bement Planer. Two Heads.
42" Gould & Eberhardt Upright Drill.
Betts Horizontal Boring Mill, 2 7-16" Bar.
Newark Horizontal Boring Mill, 2 7-16" Bar.
No. 1 Beamen & Smith Duplex Hor. Boring Mill.
No. 2 Newton Cold Saw.
Yankee Twist Drill Grinder.

Full line of New Engines and Boilers.

Write us your wants.

PERKINS & FRECKER
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2d Hand Machinery

1 Planer. Planes 14 ft. 84" x 38" 1 head.
1 Planer 30" x 7 ft., New Haven.
1 Double End Punch and Shears, 24 in. gap cut and Shears 3/4".
1 22" Prentiss Crank Shaper.
32" x 10 ft. Pond Lathe.
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25" x 16" New Haven Lathe.
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14" x 6" Blaisdell Lathe.
24" Auto. Gear Cutter.
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24" Ames B. G. Drill Press.
24" Blaisdell Drill Press.
Write for Prices.
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1-10" American Underfeed Automatic Stoker, steam driven, in good condition. Has been in operation less than one year. Price \$300.00, f.o.b. Catasauqua, Pa. Address

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One 60 ft. Standard gauge railroad turntable, good condition.
Three steel bridges of 138 ft., 101 ft. and 100 ft. spans.
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Two nearly new brass fitted 14" x 7" x 12" Epping Carpenter Duplex pumps.
One 150 H.P. Erie tubular boiler.
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One Keystone 25 H.P. contractors' boiler on four steel wheels (as new).
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Electric lighting plant consisting of:
One Tandem Compound Buckeye engine, 14 1/2 x 25 x 18.
One Buckeye engine, 15 1/2 x 16.
One 120 K.W. Westinghouse generator.
One 75 K.W. Westinghouse generator, complete.
Two 72" x 18" tubular boilers, with separate stacks.

WANTED

We are cash buyers of Rails, Machinery and all kinds of scrap material, also old plants for dismantling.
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One Bessemer Converter, diameter 84", total height 153"; complete. Two cupolas, diameter 78", height 43"; complete. All in perfect condition, having never been used.

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**BARGAINS.
ENGINES.**

- * 28 in. x 60 in. Cor. Steam Eng. Co. Corliss.
- * 27 in. x 48 in. Cummer, Heavy Duty, Auto. Cut-off.
- * 22 in. x 30 in. Stearns, Gilder Frame. (New Cylinder.)
- * 20 in. x 48 in. Wetherill Corliss Engine.
- * 18 in. x 30 in. Porter-Allen Automatic Engine.
- * 16 in. x 24 in. Mans'g, with Corliss V. and T. Governor.
- * Signifies Right-hand. † Signifies Left-hand.
- All smaller sizes down to 6 in. diam.

AIR COMPRESSORS.

16 in. x 18 in. x 36 in. Duplex, practically equal to NEW.

SHEARS. (2nd hand)

- 1 "Bertsch" Sheet Mill Shear with knives 126 in. long. Steam driven. Capacity 3-16 in. thick.
- 1 United Engineering 54 in. Squaring Shear. Capacity 3 1/2 in. thick. Belt driven.
- 2 Upright Bar shears. Capacity 5/8 in. x 7 in. with engines built on.
- 1 Excelsior Alligator type Shear 24" Knives, 2 1/4 sq. capacity.

ROLLING MILLS

Hot and Cold Rolling Tin Plate Mills.

ROTARY SQUEEZER

1 New 36-in. Newbold make.

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Globe and Gate Valves, 6 in. to 13 in.

**BOILERS, STEAM HAMMERS, FLY
WHEELS AND LATHE PULLEYS.****B. M. EVERSON,**

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New and second-hand.

B. M. EVERSON,

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Also Sales Agent for

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Special Machinery To Build

Recently enlarged shop with modern and complete equipment desires to establish connections with parties having special machines or machine tools to be manufactured. : : :
Special inducements offered with view to securing permanent manufacturing contracts. : : :
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"PROGRESSIVE,"

Care of The Iron Age, N. Y.

Engines

- 1-12 x 12 Ideal automatic self-oiling.
- 1-13 x 12 Ideal automatic self-oiling.
- 1-20 x 24 Ball automatic.
- 3-15 1/2 x 16 Armington & Sims automatic.
- 1-16 x 20 Woodbury automatic.
- 1-12 x 14 Watertown automatic.
- 1-12 x 30 Harris Corliss.
- 1-12 x 30 Green Corliss.
- 1-14 x 36 Bates Corliss.
- 1-18 x 42 Hamilton Corliss.

Boilers, Belting, Shafting, Pulleys, Wood Working Machinery.

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Electrical

Power Equipment**DIRECT-CONNECTED SETS**

- 1-30 k. w. National. 220 v. generator and a 9 x 10" Erie engine. 350 r. p. m.
- 1-50 k. w. Western Electric 6 pole. 120 v., and 12 x 12 Ideal Engine. 275 r. p. m.
- 1-75 k. w. Westinghouse multi-polar. 125 v. Generator and Westinghouse compound engine. 290 r. p. m.
- 1-75 k. w. Western Electric M. P. generator. speed 300 r. p. m., 125 v., about wound, 3 cylinder vertical Marquette gas engine.
- 1-100 k. w. Westinghouse Generator. 125 v., direct connected to 16" x 16" Cooper automatic engine.
- 1-100 k. w. Excelsior. 110 v. M. P. direct connected to Williams automatic engine.
- 1-100 k. w. Excelsior. 220 v. M. P., direct connected to Williams automatic engine.
- 1-115 k. w. Westinghouse M. P. 500 v. generator and tandem compound engine. 250 r. p. m.
- 1-150 k. w. Western Electric. 125 v., and 19 x 18 Ball Engine. 220 r. p. m.
- 1-400 k. w. General Electric. 260 v. Generator, and Williams tandem compound engine. 140 r. p. m.
- 1-750 k. w. General Electric. 260 v. Generator, and Williams cross compound engine. 130 r. p. m.
- 1-1000 k. w. General Electric. 260 v. Generator, and tandem compound Porter Allen engine. 120 r. p. m.

BELTED DYNAMOS

- 1-50 k. w. Ft. Wayne. 250 v., 600 r. p. m.
- 2-100 k. w. Westinghouse. 250 v. and 600 r. p. m.
- 1-100 k. w. Excelsior two-current. 250 v. Generator. 500 r. p. m.
- 1-200 k. w., 250 v. Westinghouse Generator.
- 2-200 k. w. Westinghouse. 550 v., 550 r. p. m.
- 1-250 k. w., 250 v., General Electric M. P. Generator.

AUTOMATIC ENGINES

- 1-11 x 22 Buckeye slide crank, outboard bearing and shaft governor.
- 2-200 h. p. 18 x 20 simple Porter Allen engines.
- 1-250 h. p. tandem compound Porter Allen. 16 x 24 x 16".
- 1-500 h. p. tandem compound Porter Allen. 20 x 30 x 24".
- 1-600 h. p. Williams hor. tandem compound. 21 x 36 x 30". with rope wheel.
- 3-13 x 20 x 15" tandem compound, center crank, horizontal Phoenix Engines, shaft governor, iron sub-base, wheels 72 x 16" face.
- 2-13 x 12 Ideal. 100 h. p., 250 r. p. m.
- 1-16 x 16 Ideal. 150 h. p., 200 r. p. m.
- 1-20 x 18 Ideal. 400 h. p., 175 r. p. m.

CORLISS ENGINES.

- 1-18 x 42 Allis.
- 1-22 x 42 Allis heavy duty.
- 1-20 x 42 Bates heavy duty.
- 1-14 x 36 Bullock.
- 1-16 x 42 Allis.
- 1-20 x 48 Bullock.

CENTRAL STATION IMPROVEMENT CO.,

937-938 Monadnock Block, Chicago.

For Sale

Two second-hand Spur Geared Tumblers, 48" diameter, 6 feet long; in good condition, and sold for want of use. Made by The Northern Engineering Works, Detroit. Address

THE BROWN COTTON GIN CO.,
New London, Conn.

FOR SALE

Good Business Opportunity

The owner of an exclusively heavy hardware business, including blacksmiths' and wagon makers' supplies, wishing to retire offers for sale his business, which has been established for thirty years. The establishment does a conservative business of about \$100,000 a year and pays about 10 to 12 per cent. on the investment. The business will be sold for the inventory price and the guaranteed book accounts, which will amount to about \$50,000. This is an exceptional opportunity for any one looking for a business of this character. Address

"B. C. W."

Care The Iron Age, The Cuyahoga, Cleveland, Ohio.

"MILL ENGINE FOR SALE"

Heavy duty tandem compound condensing Nordberg Corliss Engine; cylinders 22" and 40" x 48" stroke; complete with belt driven condenser; fine condition; weight 85 tons. For bargain price, apply to

CHAS. BEHLEN,

72 Trinity Place, New York.

BOILERS

- 3-78 x 19 200 hp., 102-4 inch flues.
- 8-72 x 18 150 hp., 130-3 inch flues.
- 18-66 x 16 100 hp., 118-3 inch flues.
- 12-60 x 16 80 hp., 84-3 inch flues.
- 4-60 x 14 70 hp., 72-3 inch flues.

Also locomotive portable boilers 10 to 100 hp., on wheels and skids.

Hoisting Engines

- 3 pair Webster, Camp & Lane Hoisting Engines, 10 x 15 double cylinder.
- 4 Drums, with patent friction clutches, used 9 months only; very cheap.

Engines

- 24 x 48 Hamilton Corliss, left hand.
- 14 x 36 Hamilton Corliss, right hand.
- 28 x 36 Porter, plain slide valve, Nordberg governor.
- 26 x 30 Tift, center crank.
- 24 x 30 Kumer, slide valve, Nordberg governor.
- 18 x 24 Kumer, slide valve.
- 16 x 30 Payne, slide valve.
- 2-12 x 20 Rice automatic, and a number of smaller engines.

New double leather belting cheap

- 300 feet 18 inch wide.
- 250 feet 16 inch wide.
- 100 feet 12 inch wide.
- 1000 feet 5 1/2 inch wide.
- 800 feet 5 inch wide.
- 1200 feet 4 1/2 inch wide.
- 1200 feet 3 1/2 inch wide.
- 1200 feet 3 inch wide.
- 1500 feet 2 1/2 inch wide.
- Hammered Iron Shafting, 300 feet from 6 inch up to 12 inch diameter.

JACOB ULLMAN

44 Lloyd Street - - - Buffalo, N. Y.

The Dustin Company

ENGINES

- Watts-Campbell, cross compound, 1500 H. P.
- Harris Corliss, simple . . . 400 H. P.
- George H. Corliss, simple . . . 250 H. P.
- Providence Greene, simple . . . 175 H. P.
- Ball & Wood, tandem compound . . . 150 H. P.
- Payne, tandem compound . . . 150 H. P.
- Armington & Sims, cross compound 125 H. P.
- Taylor, simple . . . 150 H. P.
- Armington & Sims, simple . . . 150 H. P.
- Phoenix, simple . . . 100 H. P.
- Ball (Erie), simple . . . 80 H. P.
- Straight Line, simple . . . 75 H. P.
- McIntosh, Seymour & Co., simple . . . 60 H. P.
- Sturtevant, simple . . . 50 H. P.

All ready for immediate delivery

Engines, Boilers and Electrical Machinery of every description

SEND FOR CATALOGUE

CHARLES E. DUSTIN COMPANY

11 Broadway, New York

FOR SALE

- One (1) 130 K. W. General Electric Generator, 125 volts direct connected to 18 x 14 Armington Simms Engine.
- One (1) 35 K. W. C. & C. Generator, 250 volts, direct connected to 10 x 10 Payne Engine.
- Two (2) 15 K. W. Crocker Wheeler Generators, 250 volts, direct connected to 25 H. P. Hudson Gas Engines.
- Two (2) 75 K. W. 125 volts, 4 pole Westinghouse Generator. 775 R. P. M.
- One (1) 75 K. W. 250 volts, 4 pole Westinghouse Generator. 750 R. P. M.
- One (1) 150 H. P., 230 volts, C. & C. motor, 355 R. P. M.
- One (1) 100 K. W., 6 pole, 500 volt Milwaukee Generator, 580 R. P. M.
- Three hundred (300) dynamos and motors, all sizes and makes in stock for immediate delivery.
- WANTED—Dynamometers, Motors, Entire plants or any part.
- YEARSLEY, LEVENE & CO.
211 N. 3d Street, Phila., Pa.

WANTED

Second-hand Bliss Toggle Drawing Press No. 3 1/2 A. Give condition and price.
W. B. BERTELS & SON CO.,
Wilkes-Barre, Pa.

Machinery and Supplies Engines For Sale

Boilers, Engines, Motors, Shafting, Pumps, Smoke Stacks, Structural Iron and Steel Storage Tanks.

We furnish complete lines of machinery for nearly every purpose. Our rebuilt machinery is always in perfect condition. Be sure and get our estimate. Our prices are always lowest.

For immediate delivery we offer:

BOILERS.

2—250 H. P. Erie City Water-tube Boilers.
10—72 x 16 Horizontal Tubular Boilers.
1—60 x 16 Triple Riveted Butt Strapped Horizontal Tubular Boiler good for a pressure of 150 lbs.
1—50 H. P. Erie City Economizer.
1—60 H. P. Erie City Economizer.
15—72 x 20 Quad. riveted, lap joint, butt strapped on inside, 50 4 1/2" tubes, with 16 McGregor braces above. Taken from one of the large steel mills near Chicago. Will carry 125 lbs. pressure.
2—Automatic Detroit Stokers, each capable of feeding boilers up to 300 H. P.
We can always make prompt shipment of Horizontal Tubular Boilers—any size. Get our special Boiler List.

ENGINES.

1—90 H. P. Atlas Engine, belted to a 75 K. W. Generator Rig, alternating current.
1—28 x 48 Bates Corliss.
1—16 x 36 Corliss.
1—14 x 36 Corliss.
1—16 x 42 Corliss.
3—11 x 16 Atlas Automatic.
1—18 x 24 Atlas Automatic.
1—22 x 47 Porter Hamilton.
1—16 x 16 Ball.
1—13 x 12 Ball.

We can also quote you low prices on Machine Tools, Belting, Shafting, Hangers, in fact, everything in the line of supplies for Factory, Mines, Foundry or Office.

Ask for our Special Catalogue No. 78.

Chicago House Wrecking Co.

35th and Iron Streets,

CHICAGO

For Sale

75 H. P. Nash Gas Engine

Direct connected to 45 K. W. C. & C. Generator, 225 volts. In first-class condition. In use one year and can be seen running. Complete with all regular fittings.

GREEK-AMERICAN CONFECTIONERY CO.
7-11 Marion St., N. Y. City.

FOR SALE

Japan Ovens

Four enameling or japanning ovens, with gas burners. All asbestos lined and in good condition. Sizes from 6' x 6' x 5' to 7' x 11' x 8'.

BOX 260, Boston, Mass.

FOR SALE

Addressograph, No. 2, with Cabinet complete. Practically new, chain system, using metal plates, rubber type; case suitable for ten thousand names. \$55.00. Address LAIB CO., Louisville, Ky.

1—10 x 6 Bass Corliss.

1—14 x 14 Ideal.

1—19 x 11 Westinghouse.

10—Traction Engines, 10 to 25 H. P. All makes.

MOTORS.

50 Westinghouse Motors, 5 to 70 H. P., 3-phase, 440 volt, type "C" used about one week, good as new. Very low prices.

PUMPS.

3—8 x 8 x 10

1—8 x 10 x 12

1—10 x 10 x 12

1—6 13, Hydraulic

1—10 x 7 x 12

1—8 x 2 1/2 x 10

1—9 x 5 1/4 x 10

1—No. 2 Rotary

SMOKE STACKS.

50 Good Steel Smoke Stacks. Size from 12 to 72". Will save you 50% and make quick delivery.

STRUCTURAL IRON.

40 Carloads of Beams, Channels, Angles, Tees, Columns, Trusses, Girders, Etc.

Can always furnish anything you need in this line promptly. Send for our "Structural Iron News." It's a monthly sheet of bargains.

STEEL TANKS.

Capacity 6000 to 8000 gal. Made of 1/4" steel; all have 5-16" head—standard domes, with screwed manhole.

These are in fine condition, good as new.

FOR SALE

One Norwalk 2-Stage Air Compressor, Steam 20", Air 22 and 13 1/2", Stroke 24", Capacity 1160'. Thoroughly good operative condition; can be inspected under steam.

PFANNMUELLER ENGINEERING CO.

Suite 1134, First National Bank Bldg.
CHICAGO

For Sale

ENGINE AND GENERATOR BELTED

1—16 x 18 Erie Engine.

1—75 K.W. D.C. 250 Volt Generator. Complete with Switchboard and attachments. All in good condition. Larger unit being installed.

THE COLUMBUS IRON & STEEL CO.,
Columbus, O.

For Sale

One 75-lb. Beaudry Champion Power Hammer, sound and in good working condition. Address E. S. HULBERT & CO., INC., Bernardston, Mass.

SIMPLE

12 x 12 Harrisburg Ideal.
12 x 36 Harris Corliss.
16 x 30 J. Cooper Eng. Co.'s.
20 x 42 Watts Campbell Corliss.
30 x 60 Rankin & Fritch Corliss.

COMPOUND

10 & 17 x 16 Lansing Iron Works, tandem.
16 & 30 x 4 Hamilton Corliss, cross, rope drive.
16 & 27 x 16 Ball & Wood, cross.
20 & 48 x 48 Hamilton Corliss, tandem.
24 & 48 x 48 Buckeye, tandem.
30 1/2 & 48 x 48 Allis Corliss, cross, rope drive.
24 & 40 & 56 x 60 Allis Corliss, cross.

Boilers, Motors, Generators and other Steam and Electric Apparatus.

**Rossiter,
MacGovern & Co. (Inc.)**
90 West St.,
NEW YORK CITY.

BARGAINS

Full line of New and Second Hand Engines, Boilers, Pumps. Write for what you want. LOVEGROVE & CO., INC.,

143-145 N. Third St., Philadelphia.

McDOWELL & COMPANY,

ALLEGHENY, PA.

We carry in stock a full line of second-hand Engines, Boilers, Pumps, Electrical Machinery, Pipe Casing and fittings, all sizes.

BOILERS

72" x 16'—66" x 16' Hor. Tubular.
1—100 H.P. Cahall Water Tube.

ENGINES

20 x 42 Corliss.
20 x 24 Green.
18 x 24 Russell.
14 1/2 x 16 Buckeye.

PUMPS

18 x 10 x 12 Snow.
12 x 14 x 1 Smith-Vale.
18 x 3 1/2 x 15 Hyd. Pumps made by Wilson, Snyder Co.

The Peterson Construction Company,
Room 704 Penn Building, Pittsburgh, Pa.

EMERSON STEAM PUMPS

For foundation and tank work. A pump especially adapted to construction and other work requiring the handling of large quantities of clear and dirty water, 150 ft. heads and lower. Present stock sizes, No. 1—225 gal. per min. 2—415 gal. per min. 4—1200 gal. per min.

EMERSON, JR.

The CONTRACTORS' Pump

Junior A. 3" suction, requires 4 H.P. boiler, capacity 6000 gal. per hr.
Other sizes, too. Ask for bulletin No. 12.

Carlin MACHINERY & SUPPLY CO., Inc.
227 Sandusky St., Allegheny, Pa.

WANTED

1 (one) 50 or 55 ton Saddle Tank Locomotive, to be used for switching purposes, being built for standard gauge. Please send full specifications. Address "D. A." care The Iron Age, New York.

Rolling Mill Machinery FOR SALE.

We have the following machinery in good condition for sale. Will make low prices to quick purchasers:

SHEARS.

- 1—Union Fdy. & Mch. Co. Alligator Shear; capacity, 4" x 3/4" flats and 1 1/2" rds.
- 1—Hoagland Alligator Cam Box Shear; jaws, 24"; capacity, 8 x 1" flats.
- 1—Alligator Shear; weight, 20,000 lbs.; 15" knife; used for shearing rails; will also shear 3" rds.

BOILERS.

- 1—100 H.P. 28' Locomotive Boiler.
- 1—80 H.P. Horizontal Tubular Boiler, 66" diam., with 3" tubes 16' long, with jacket, smoke box, etc., complete.

SQUEEZERS.

- 2—Large Squeezers, in good condition; capacity, 250-lb. ball; one overhead drive, one underneath drive.

ROLL TRAIN.

- 1—Three-High 18" Puddle Mill, 2 stands roll housings, 1 stand pinion housings, with several sets of pinions and rolls. Can roll 3" and 4" billets and 3, 4, 5 and 6" muck bar.

ENGINES.

- 1—American & British Corliss Engine, 24 x 36, with 25,000-lb. fly wheel attached, 20' diam., 9" rim and 11" face.

MISCELLANEOUS.

We have Pulleys, Lathes, Planers, Busheling Furnace Castings and a large quantity of Rolling Mill Castings for sale.

THE ROCKAWAY ROLLING MILL,
Rockaway, New Jersey.

FOR SALE OR LEASE For a Term of Years.

A finely equipped gray iron foundry. Established business. Capacity, 30,000 lb. per day; 2 electric traveling cranes of 30-ton capacity; compressed air; 2-cent electricity, 7-cent gas. Located central Ohio, on 2 trunk lines. Address "ABC," care *The Iron Age*, New York.

Power Plant for Sale.

BOILERS—ENGINES—GENERATORS.

- 2—60 x 16 ft. Horizontal Tubular Boilers.
 - 1—14 x 36 Corliss Engine.
 - 1—12 x 12 Ideal Engine.
 - 1—30 K. W., 125 V., D. C. Westinghouse Generator.
 - 1—37 1/2 K. W., 250 V., D. C. Westinghouse Generator.
- All in good condition.

Further particulars upon request.

THE WARNER & SWASEY CO.,
CLEVELAND, O.

WANTED

One 2" or 2 1/2" upsetting machine not geared. Address

"MACHINE,"
Care *The Iron Age*, Park Building,
Pittsburgh, Pa.

FOR SALE

20 Ton Fairbanks Crane Scale used three months. Apply

BELL & FYFE, Astoria, L. I.

Potter and Johnson 8 1/2" x 16" Automatic Turning and Chucking Machine wanted at once.

Second hand machine, in good condition, acceptable.

Communicate with

AMERICAN AND BRITISH MFG. CO.
BRIDGEPORT, CONN.

NOTICE TO CONTRACTORS.

Sealed proposals, with plans and specifications attached, will be received by the City of Fort Worth, for the erection of a two story, brick work house complete, with plumbing, steam heat, with basement for boilers, and electric lights for cells. Office and store room first floor; guard's room and bath room second floor; to be fitted eight cells on each floor, to accommodate four persons each. Four cells face lengthwise on each floor and set back to back. Submit alternate proposal, leaving all cells and cage work off on second story. All bids must be in not later than 10 o'clock A.M. July 20, 1907.

The City of Fort Worth reserves the right to reject any or all bids.

J. J. NUNNALLY, City Auditor,
Fort Worth, Texas.

WANTED

Hardware and Implement Specialties.

We wish to add to our line and would like to represent you in the Northwest, or would arrange to manufacture your goods and handle them through our own men. We have splendid facilities for handling specialties from the Mississippi to the Pacific Coast. What have you?

LAW MFG. CO.,
St. Paul, Minn.

Bell & Fyfe Foundry Company

FOR SALE. 5 Ton Electric Crane, built by Northern Engineering Co.

Apply

BELL & FYFE, Astoria, L. I.

FOR SALE

Acme Gas Plant, manufactured by the Industrial Gas Co. of New York, including generating tanks, blower, etc., complete. Address

THE BUDA FOUNDRY & MFG. CO.,
Harvey, Ill.

Concern in Western Pennsylvania desires orders for drop forging work. Has excellent facilities for prompt execution of high grade work.

Address "W. R.," care *The Iron Age*, New York.

Representation for Manufactures

The undersigned has opened an office at Seattle, Washington, and requests communications from all who desire representation in Washington, Oregon and adjoining States, together with British Columbia and Alaska. Fifteen year acquaintance in the territory and twenty-five years' experience covering nearly every branch advertised in *The Iron Age*. Address E. C. ADAMS, P. O. Box 487, Seattle, Washington.

EXPERIENCED COMMERCIAL MAN

WANTED—By long established company, manufacturing high class food products, a gentleman experienced in modern methods of selling, with general business experience, to take charge of selling staff, prepared to invest \$100,000 if investigation proves mutually satisfactory. Address "COMMERCIAL,"
Care *The Iron Age*, New York.

STOCK FOR SALE.

My 1-3 interest in the capital stock of **Weaver, Palmer & Richmond**, hardware dealers, Rochester, N. Y. Having identified myself with the Weaver Hardware Company, Rochester, N. Y., I desire to dispose of my interest as mentioned above, and am ready to name a very favorable price on same. Address
S. J. WEAVER,
Care WEAVER HARDWARE COMPANY, Rochester, N. Y.

INGOT. MOULD ENGINEER

Having four years' experience with the largest ingot mould producer, making large profits, can reduce present costs 15 to 25 per cent., wishes to interest capitalists or large blast furnace interests. Can enlarge latter's profits two to five dollars per ton. Address RAYMER T. HANFORD, Constructing Engineer, Sharon, Pennsylvania.

Free Factory Sites and Buildings

At Decatur, Indiana

To responsible parties, will donate site and erect suitable factory buildings. Three trunk line railroads; 170 miles from Chicago; no labor troubles; beautiful city for residence; promoters need not apply. To parties desiring to locate legitimate industries it will pay to investigate. For full information, address

Commercial Club

DECATUR, INDIANA

FOR SALE

Valuable Iron Property in Virginia

consisting of 13,500 acres of fee lands, mostly covered with timber; containing iron ore deposits of several million tons, running from 40 to 50 per cent; limestone deposits of good grade, a blast furnace and private railroad; is well located as to market, has good railway connections, possesses unusual advantages and affords a fine opportunity for profitable investment.

J. T. JACKSON & CO.,
Chestnut and 13th Streets, Philadelphia, Pa.

GOOD SECOND HAND ROLLS, SHEARS PUNCHES AND MACHINE TOOLS.

6', 8', 10' and 18' Bending Rolls.
3' to 6' Light and Heavy Sheet Forming Rolls.
3' and 8' Squaring Shears.
Power Punch to punch 1/2" x 1/2".
Lever Shears and Punches.
Roll Grinding and Corrugating Machines for flour mill rolls.
Gear Planer for spur or bevel gear.
Four-Spindle Nut Tapper.
Line Shafting, Pulleys, Hangers, Blowers and Anvils. BERTSCH & CO. Cambridge City, Ind.

Gas Engine Electric Plant

Two 40 KW. 125 V. Western Electric Generators, direct connected to two 60 H. P. vertical double cylinder splash lubricating gas engines. Complete switchboard, air tanks and compressor. Used less than one year.

WICKES BROTHERS,
117 and 119 Fourth Ave., Pittsburg, Pa.

RECEIVER'S PUBLIC SALE on the premises late of the Crum Lynne Iron and Steel Company, at Crum Lynne (Leiperville) Delaware County, Pennsylvania, on Thursday, July 11, 1907, at 2:30 P. M., of all the real estate of said company, consisting of tract of land with corrugated iron PLATE MILL thereon erected, and boilers, engines, machinery, tools and fixtures, comprising a complete plate mill.

Also lots of land with two DWELLING HOUSES thereon erected, together with office stock shed, railroad tracks, scales and other appliances.

Detailed information will be furnished by

JOHN GRAHAM, Receiver,
Crum Lynne, Del. Co., Penna.
or No. 1307 Real Est. Tr. Bldg. Phila.

Or his attorneys,
JOS. H. HINKSON,
Law Bldg., Chester, Penna.

WALTER E. REX,
No. 524 Walnut St., Phila.

E. BISSELL & CO.

WHOLESALE

HARDWARE AUCTIONEERS,

5 and 7 Mercer Street, N. Y.

Sales held weekly for the trade. Consignments solicited. We refer to the leading manufacturers and importers.

ROLLING MILL MACHINERY

Having recently purchased the entire plant of THE W. H. GRIFFITH CO., Inc., WAYNESBURG, PA., Manufacturers of Sheets and Tin Plate, and having use for but part of same, we offer For Sale the balance, at prices less than 50 per cent. of the original cost. All of this Machinery is practically good as new, having been in use for less than a year.

Below we give partial list—complete list with details furnished upon request.

- | | |
|--|--|
| 1—Canton Roll & Machine Co. Squaring Shears, 108" knives with gauges, pulleys, extra knives, complete. | 1—Steel Spindle 5 ft. long, 15" in diameter, 10 x 6 x 16 Wobble. |
| 4—Canton Roll & Machine Co. Right Hand 42" Doubling Shears, complete. | 5—New Cold Rolls—complete with Wobble. |
| 4—Canton Roll & Machine Co. Left Hand 42" Doubling Shears, complete. | 5—New Hot Rolls—complete with Wobble. |
| 2—Canton Roll & Machine Co. Squaring Shears, 42" knives, complete. | 1—American Feed Water Heater, 400 H.P. |
| 5—Cold Mills, complete, Rolls 22 x 34, 16" neck, 14 x 5 x 9 Wobble. | 1—Wainright Water Tube Heater, 500 H.P. |
| 2—32" Resquaring Shears. | 73—Annealing Covers, 34 x 32 x 30. |
| 6—Platform Scales, from 500 to 10,000 lbs. capacity. | 420 ft. of 6" I-Beams. |
| 5—Charging Buggies. | 120 cast iron Annealing Bottoms, 28 x 36. |
| 1—Mesta Pickling Machine, No. 2—Mesta pattern. | 5—Tin Plate Trucks. |
| 1—28 x 48 Totten & Hogg, Right Hand Engine, 20 ft. Fly Wheel. | 1—Union Foundry & Machine Co., Dublin Polisher. |
| 1—I. & S. Belt Driven Air Compressor, 8 x 18, capacity 69 cubic ft. at 160 revolutions per minute. | 8—Standard Branners. |
| 1—36 x 8 ft. Air Tank, usual trimmings. | 1—Monessen Cleaner, complete, with Straightener. |
| 1—30 x 60, Right Hand Semi Heavy Duty, Bates, Corliss Mill Engine, with 30 ft. Fly Wheel. | 6—Ellwood Polishers, complete, with Straighteners. |
| 1—28 x 60 Left Hand Philadelphia Corliss Rolling Mill Engine, 30 ft. Fly Wheel. | 1—Extra large, Thomas & White, 6 roll, Tin Pots and Machines, complete, rolls 44 x 6, for long sheets. |
| 1—Oil Well Supply Co. 12 x 14 centre crank slide valve Engine. | 3—Thomas & White, 6 roll, Tin Pots and Machines, complete. |
| 5—Hot Mills, complete, rolls 26 x 36—20" necks, 10 x 6 x 16 Wobble. | 4—Jimbo No. 4 Roll, Tin Pots and Machines, complete, 48 inches. |
| 1—Steel Spindle 11 ft. long, 15" in diameter, 10 x 6 x 16 Wobble. | 1—Unic Foundry & Machine Co., Slitting Shear, 2 extra knives, 32 inches. |
| 1—Steel Spindle 10 ft. long, 15" in diameter, 10 x 6 x 16 Wobble. | 1—Sennett, 10 x 12 centre crank Engine, with Gardiner governor. |
| 1—Steel Spindle 17 ft. 10" long, 15" in diameter, 10 x 6 x 16 Wobble. | 4—200 H. P. Geary Water Tube Boilers, complete—including stack, and all castings for each boiler. |
| | 16—50 H.P. Merrill straight line Gas Burner. |
| | 1—10 x 5¼ x 10 Worthington Duplex Pump. |
| | 1—10 x 5 x 10 Slow Duplex Pump. |
| | 1—10 x 6 x 10 Buffalo Duplex Pump. |
| | 1—12 x 6 x 18 Cameron Single Action Pump. |

Also a lot of Pulleys, Hangers, Shafting, Belting, etc.

Manufacturers of
SHOVELS, SPADES AND SCOOPS,
RAILROAD TRACK TOOLS,
BOLTS, NUTS AND WASHERS, ETC.

HUBBARD & CO.

PITTSBURGH, PA., U. S. A.

Locate Your Factory in BRIDGEPORT, CONN.

The Industrial Capital of Connecticut.

Population, 100,000.

56 Miles from New York.

Skilled Mechanics

No Labor Troubles.

For full information, write to the

Bridgeport Board of Trade.

PIPE.

Pipe and Tubing bought for the highest cash price. No amount too large or small.

EASTERN PIPE & TUBE CO.,
P. O. Box 1414, Boston, Mass.

FOR SALE

Removing to Chicago Heights, the MORDEN FROG AND CROSSING WORKS offers its three acre tract, with buildings, on Belt Railway, in South Chicago, 68,000 square feet under roof, with heavy foundations for machinery, 30 inch delivery tracks throughout, and two travelling cranes. Apply to O. S. GAITHER, Sec'y, 405 First National Bank Building, Chicago, Ill.

For Sale

Hardware Stock and Two Story Brick Building, 80 x 60, with basement; stock about \$4,000; will sell stock and lease building; well located in county seat; timber and coal section; one railroad, another building; big coal mines to be opened in spring; exceptional opportunity.

Address, C. B. Chancellor, Parkersburg, W. Va.

Rails in Stock

6 inch Girders, with Splices, about 100 tons.

65 lb. Relayers, 30 tons.

50 lb. Relayers, 13 tons.

20 lb. New Rails, 20 tons.

T. P. CONARD & CO.,

2 South 15th Street, Philadelphia, Pa.

Business Opportunity.

A gray iron foundry, with an established business and capacity of 750,000 pounds per month, fully equipped for heavy work. Would take in an active partner desiring to buy an interest in the business. For details address "FOUNDRY COMPANY," care *The Iron Age*, New York.

Blast Furnace and Ore Beds For Sale

to close estate; all favorably located six miles from Utica.

I. A. WILLIAMS, Utica, N. Y.

New Electric Locomotives

We offer at less than cost

Three Jeffrey Electric Locomotives

6 tons, 21½" outside gauge, 30 H. P.

WALTER A. ZEINICKER SUPPLY CO.
111 ST. LOUIS

Elmira Steel Co. Property FOR SALE

Two 20 gross ton Basic Open Hearth Steel Furnaces (now in operation).
Universal Plate Mill, rolls 6 in. to 30 in. (ready for operation).

Three Merchant Bar Trains, 9 in., 12 in., 22 in.

Puddle Mill, 13 Furnaces, 8-high Muck Train. Chemical and Testing Laboratories, Machine, Blacksmith and Carpenter Shops, Store-rooms, Supplies, &c.

Nine acres of ground, inclosed by a high fence. Good buildings.

This property has every facility and readiness to make a most advantageous plant for the establishment of a steel casting plant.

Railroad connections—Pennsylvania, Erie, Lehigh Valley and D. L. & W. Address

E. B. LEAF & CO.,

1242 Real Estate Trust Building,
Philadelphia, Pa.

For Sale

Manufacturing sites at very reasonable prices; plenty water; cheap fuel; good railroad service; railroad siding. Write the

PARKERSBURG LAND COMPANY,
Parkersburg, W. Va.

Wanted

A complete plant for the manufacture of dry cement blocks, also of sand lime brick.

The plant must include:

1—Six hydraulic presses, with rotating table, with a capacity of 250 atmospheres.

2—One pump capable of supplying ten presses of this type.

3—A pressure accumulator, with a capacity up to 250 atmospheres.

The offer must be written in French and must be addressed to LEON CARVIN, Rue du Muguet 1, Marseilles, France.

VAULT DOORS

With Frame and Combination
for sale cheap.

WALSH'S SONS & CO., Newark, N. J.

Iron Pipe Couplings

We buy these, all sizes, any quantity. Small sizes particularly wanted.

GWILLIAM SUPPLY COMPANY,
1339 Ridge Ave., Philadelphia, Pa.

Manufacturing Sites CLEVELAND, OHIO

Free Water—Unlimited Supply

Prices extremely low

best trackage and switching facilities, paved streets and street car service.

One site with abundant concrete stone, suitable for large plant; also one site with 700 Horse Water Power. For particulars and engineer's reports, address

THE BEDFORD GLENS CO.

1515 16 Williamson Bldg. Cleveland, Ohio

IN STOCK

PORTABLE

TRACK 9 lbs. to 20 lbs.

RAILS 9 lbs. to 45 lbs.

CARS of every description

IMMEDIATE Delivery Obtainable

See page 72

ARTHUR KOPPEL COMPANY

MORRIS BUILDING, NEW YORK
1639 Monadnock Building, Chicago
Machene Building, Pittsburg

FOR SALE

15,000 tons 56, 60 and 65 lb. relaying rails and angle bars for Cincinnati, E. St. Louis delivery.

1000 tons 60 pound relayers and angle bars. Tidewater and Eastern delivery.

1000 tons 60 pound relayers and angle bars. St. Louis and Southern delivery.

200 tons NEW 16 pound rails.

200 tons NEW 20 pound rails.

200 tons NEW 25 pound rails, with fastenings.

500 tons 48 lb. relayers and angle bars for Eastern delivery.

THE JOS. JOSEPH & BROS. CO.
CINCINNATI, OHIO

Well Equipped Machine Shop Centrally Located

desires to manufacture some specialty or patented article, either contract or royalty basis. Address "J. W. S.," care *The Iron Age*, New York.

For Sale or Lease

Charcoal Blast Furnace, Chatham, New York. In condition to resume at little expense. Highest reputation for manufacture of superior grade Salisbury Chatham Charcoal Pig Iron. Address

UNION IRON & STEEL CO.,
71 Broadway, New York.

Relaying Rails

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HEATERS and ROUGHERS wanted; state if you can accept position on prompt notice; must be sober and industrious; middle aged men of experience. Address Falls Hollow Staybolt Company, Cuyahoga Falls, Ohio.

PUBLICITY ENGINEER; man to take charge of publicity department of company building large engines and other heavy machinery. Address "Publicity," care *The Iron Age*, Park Building, Pittsburgh, Pa.

FOREMAN for molding machines in large Western malleable iron foundry; must be hustler; state fully experience, age and salary; all correspondence confidential. Address "C. S.," care *The Iron Age*, New York.

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A PARTIAL LIST OF

BELT POWER BENDING ROLLS

Size	Top Rolls, Diameter	Bottom Rolls, Diameter	Length between Housings.	Code
D.....	8"	6½"	6' 2"	Clan
D.....	8"	6½"	7' 2"	Clang
D.....	8"	6½"	8' 2"	Clash
E.....	9½"	8"	8' 8"	Clasp
E.....	9½"	8"	10' 2"	Class
F.....	11½"	9"	8' 2"	Clear
F.....	11½"	9"	10' 8"	Clever
F.....	11½"	9"	12' 2"	Clew
G.....	13"	10½"	10' 2"	Clock
G.....	13"	10½"	12' 2"	Cloth
G.....	13"	10½"	14' 2"	Cloud
H.....	15"	12"	12' 2"	Clutch
H.....	15"	12"	14' 2"	Coast
H.....	15"	12"	16' 2"	Comet
I.....	18"	15"	12' 2"	Cope
I.....	18"	15"	16' 2"	Copy
I.....	18"	15"	18' 2"	Cord
I.....	18"	15"	20' 2"	Count
J.....	20"	16"	12' 2"	Crave
J.....	20"	16"	16' 2"	Crest
J.....	20"	16"	18' 2"	Critic
J.....	20"	16"	20' 2"	Crow

Notice:—On machines larger than size H, the top roll is raised and lowered by power

HAND POWER BENDING ROLLS

Size	Top Roll, Diameter	Bottom Roll, Diameter	Length between Housings.	Code
A.....	5"	4"	4' 2"	Crude
A.....	5"	4"	4' 8"	Cubic
B.....	5½"	4½"	4' 2"	Cull
B.....	5½"	4½"	5' 2"	Curb
C.....	6½"	5"	4' 2"	Dally
C.....	6½"	5"	5' 2"	Dandy
C.....	6½"	5"	6' 2"	Debar

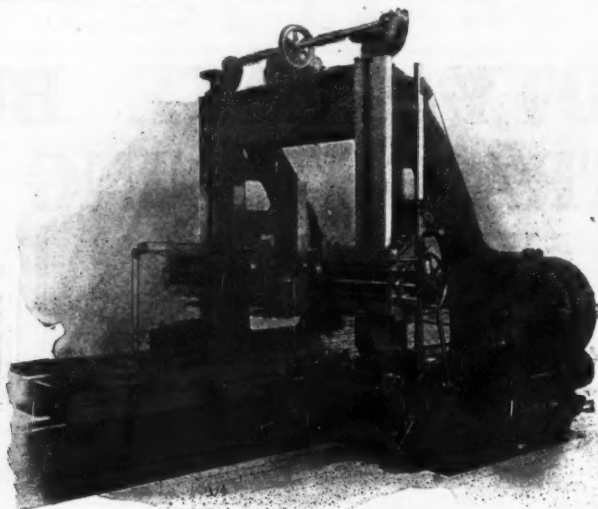
These rolls can be supplied with friction clutch pulleys, which changes them into a power machine

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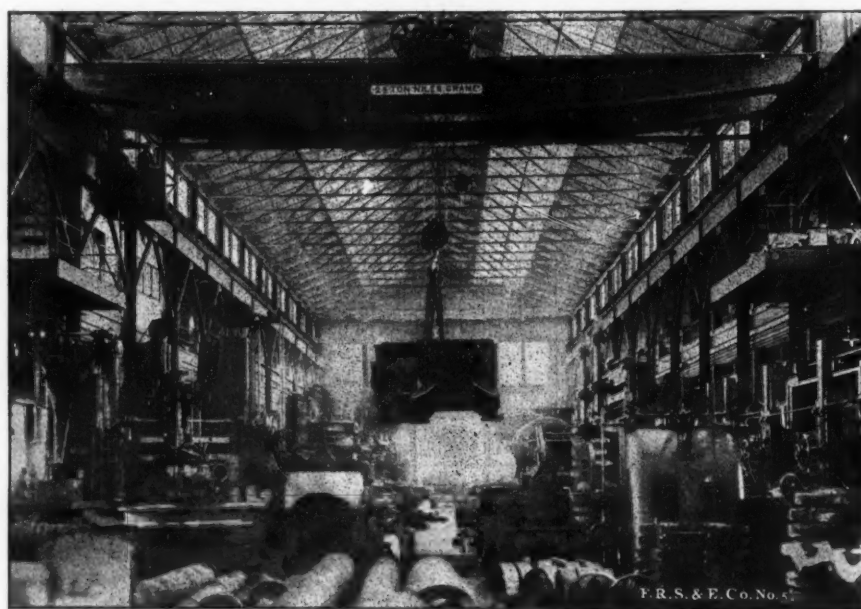
17 inch to 14 feet

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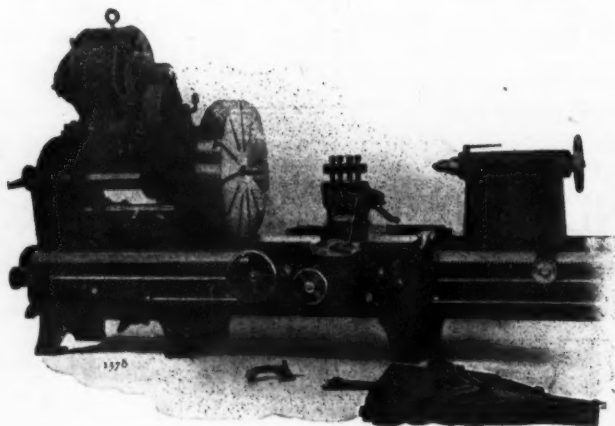
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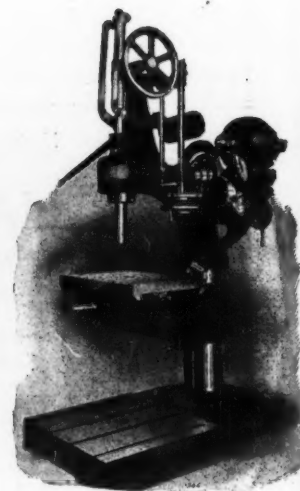


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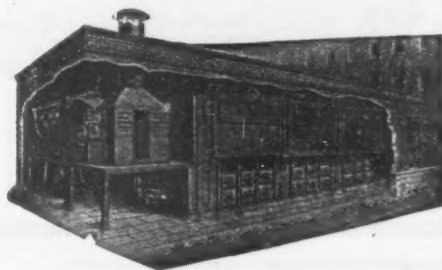
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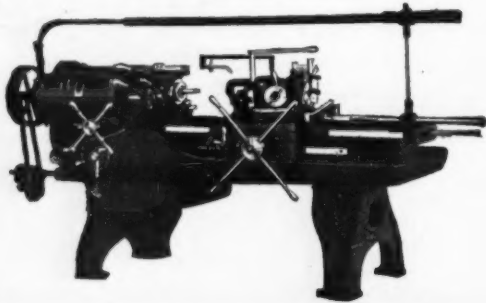
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See Page 147

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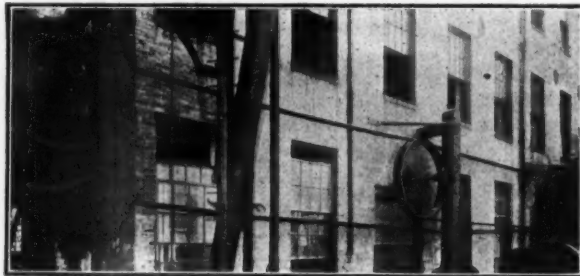
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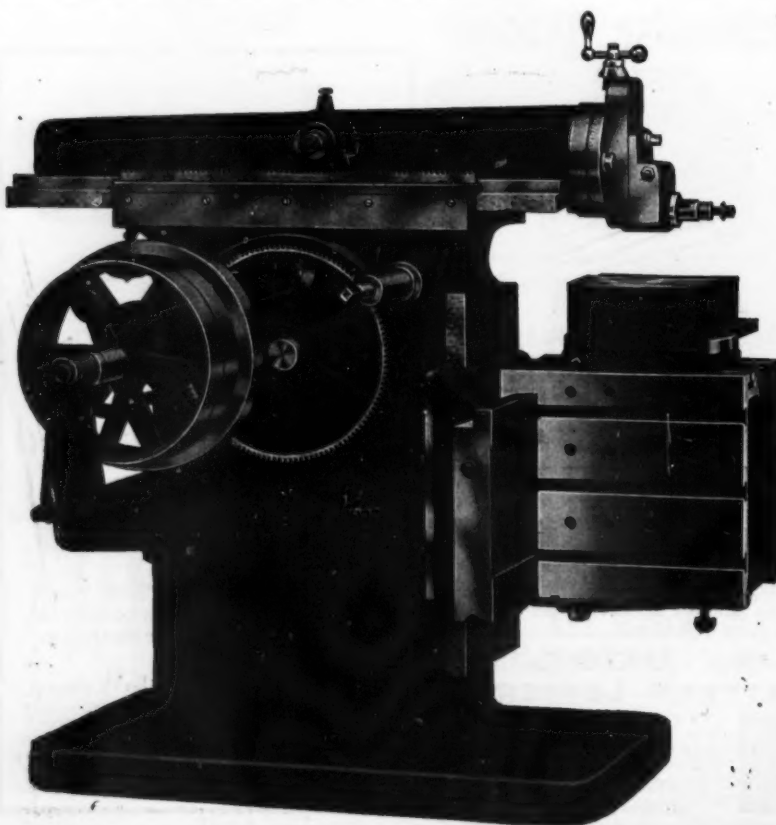
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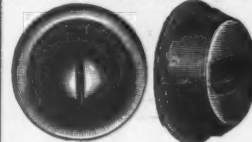
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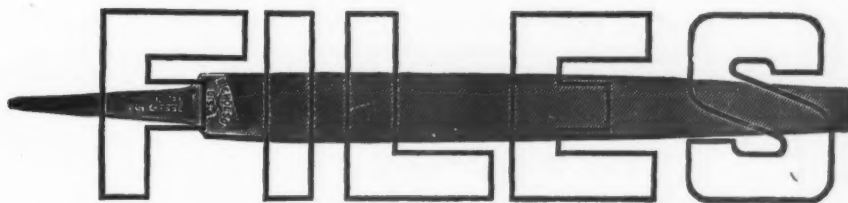
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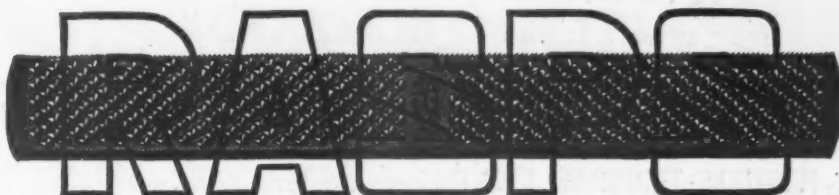
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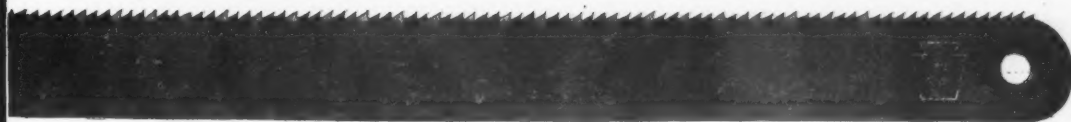
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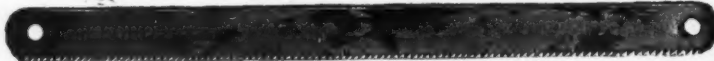
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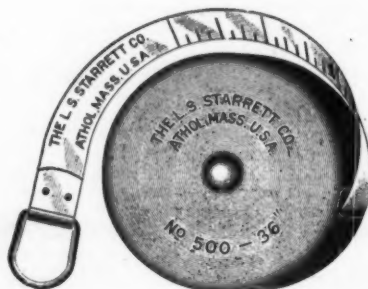
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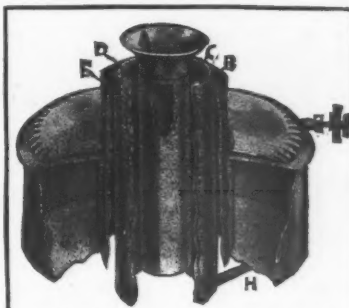




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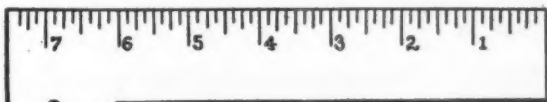
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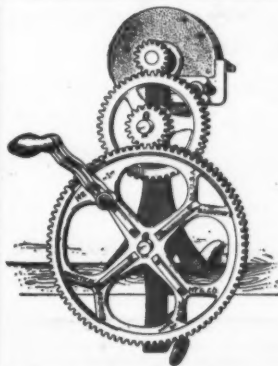
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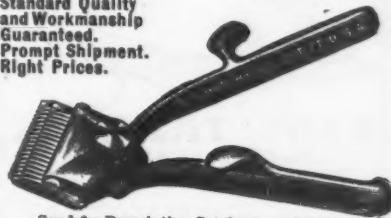
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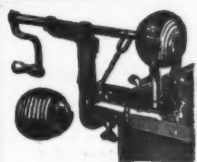


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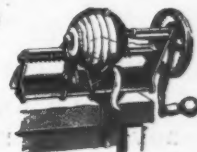
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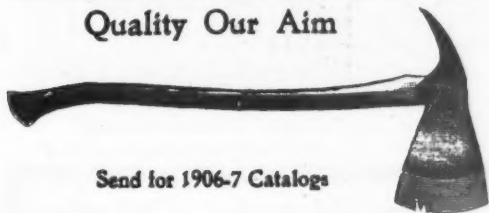
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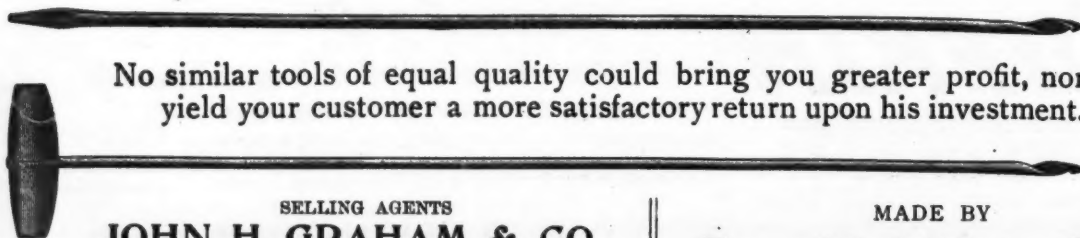
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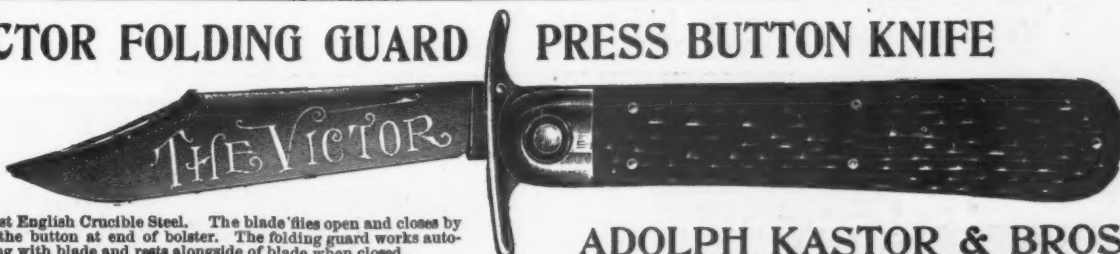
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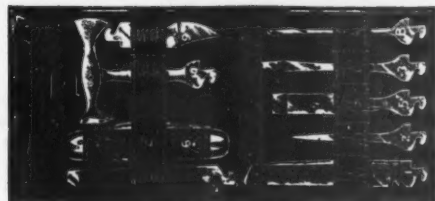
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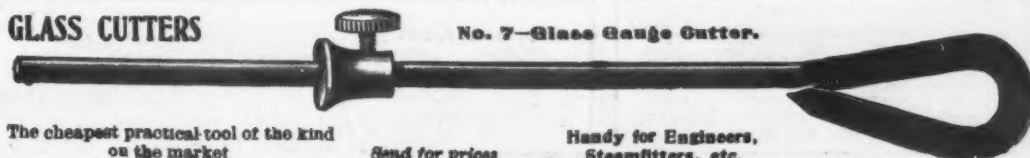
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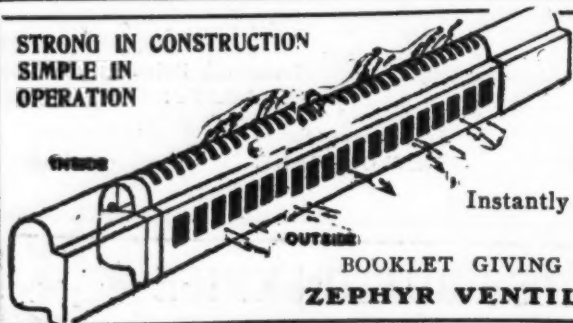
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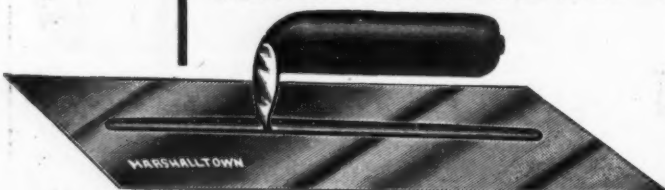
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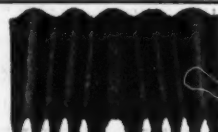
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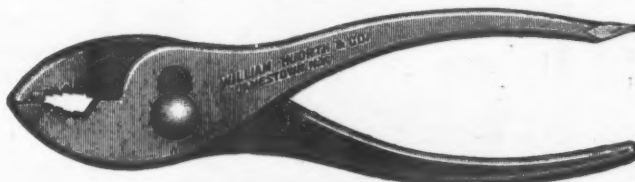
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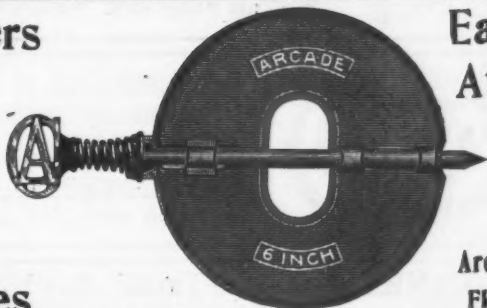
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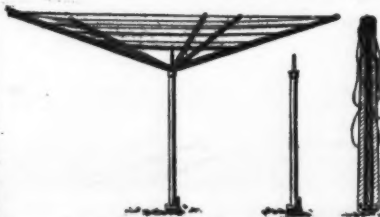
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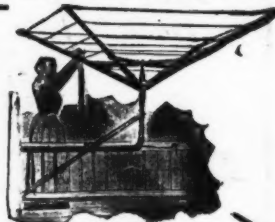
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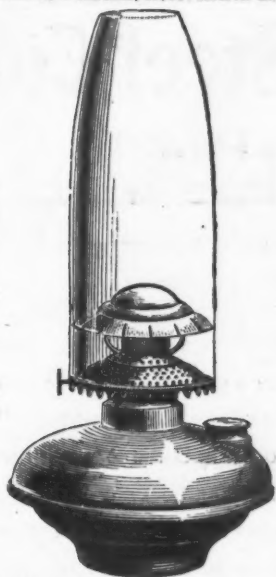
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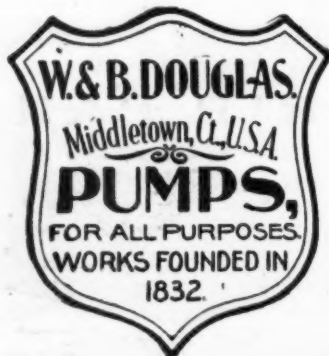
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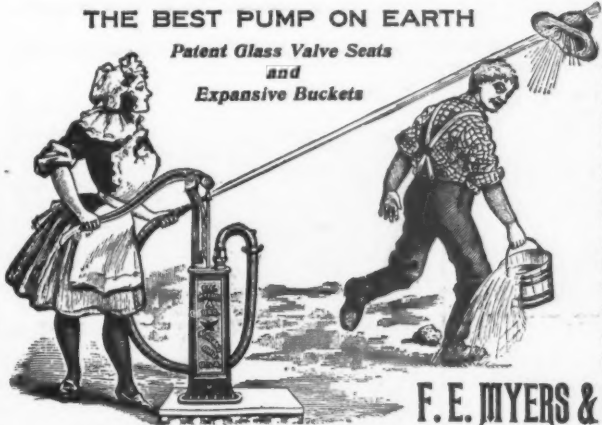
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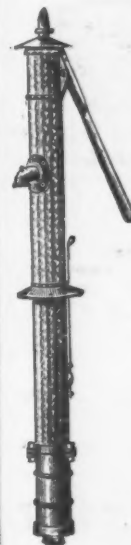
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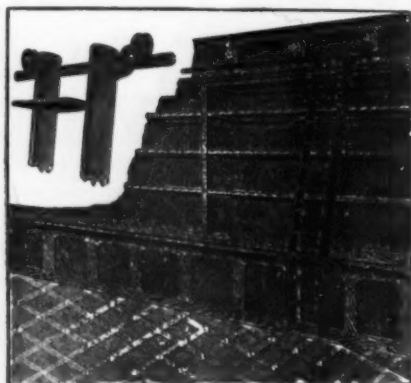
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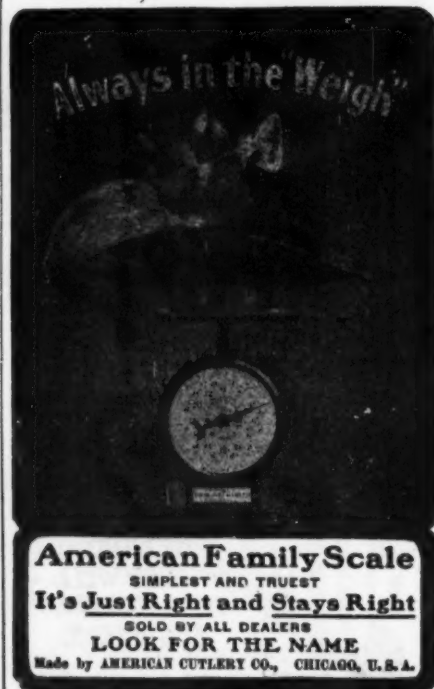
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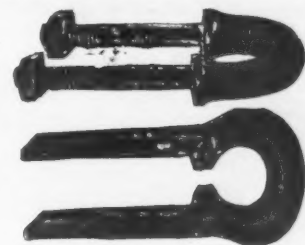



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For Dredges, Steam Shovels, Cranes, Quarries, Slings,
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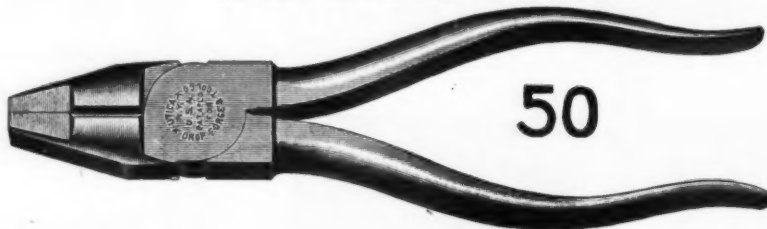


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Best sellers because the best advertised. Ask your jobber.
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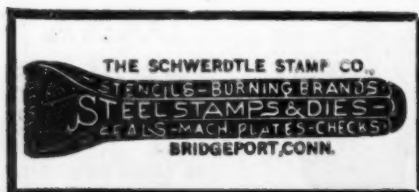
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Gas Plier
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Wrench
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Best Finish

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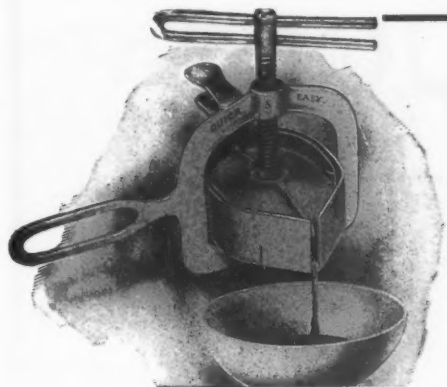
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Two years on market, has proved superior to all old styles.
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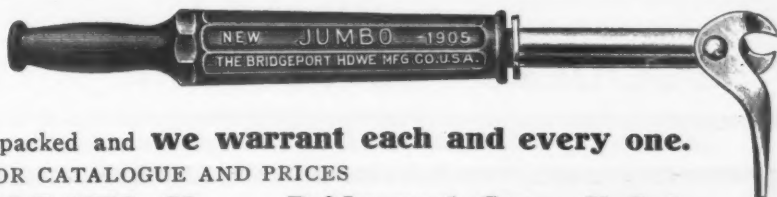
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are carefully tested before they are packed and **we warrant each and every one.**

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Bullard Wrench

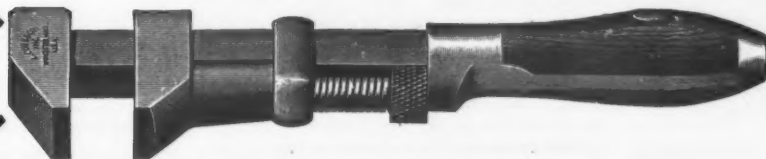


You may not require all of the gripping power that is found in this wrench, but it is **there** if you do. Send for the "Bullard Book."

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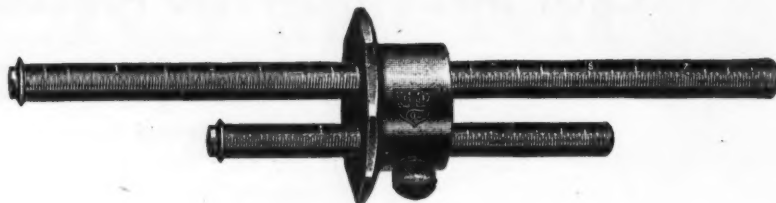


the handle, but 10 to 15 per cent. stronger throughout than any imitation or substitute wood handle wrench made by others.

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Agents, J. C. McCarty & Co., and John H. Graham & Co., New York

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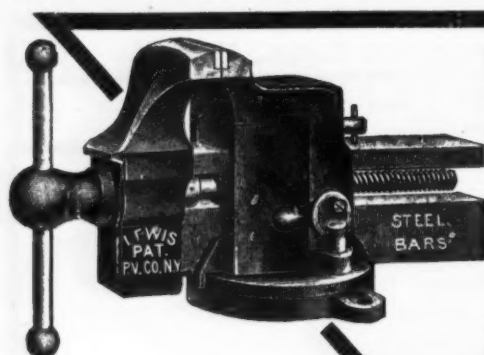
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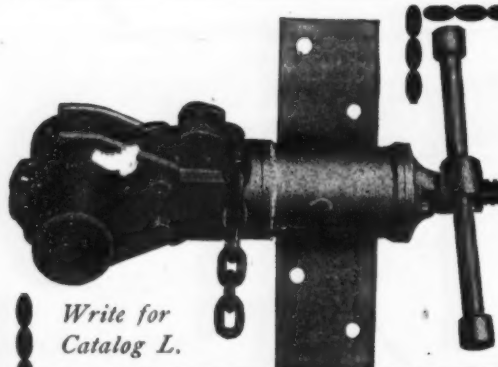
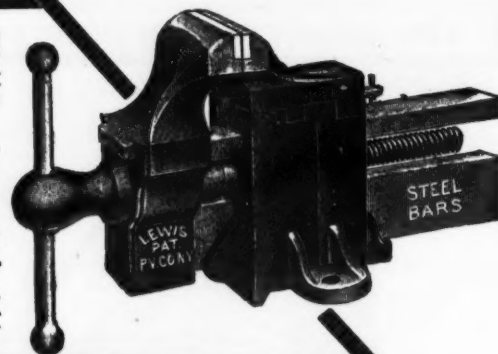


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Anywhere—to post, tree, beam, fence or bench.

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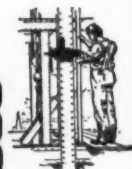
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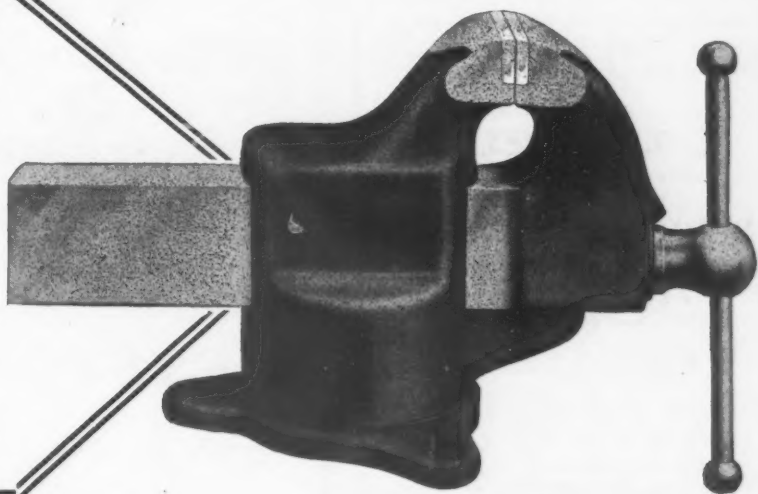
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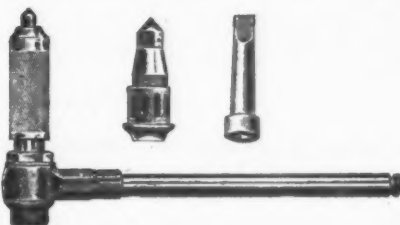
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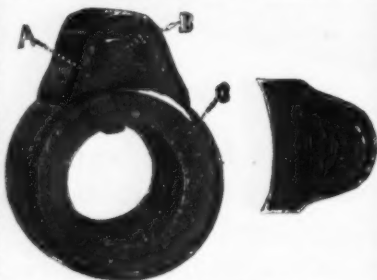


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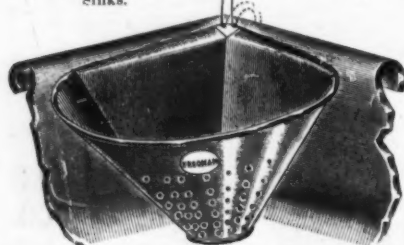
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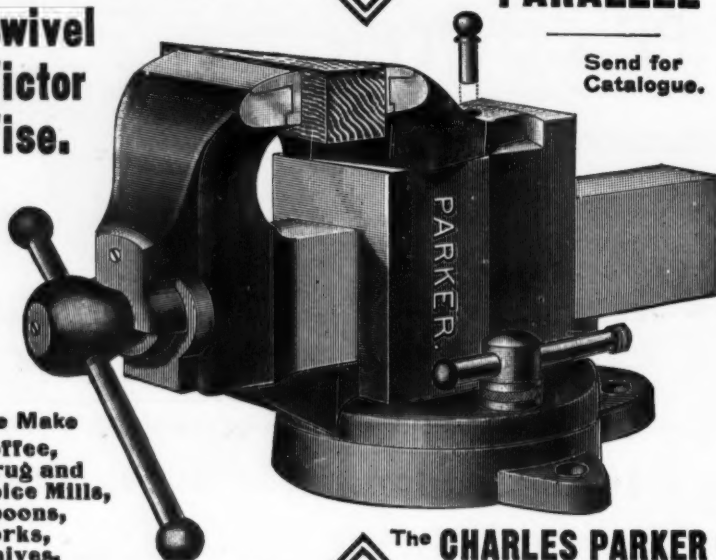
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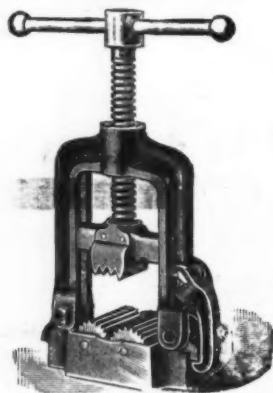
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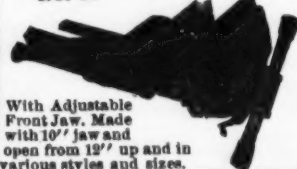
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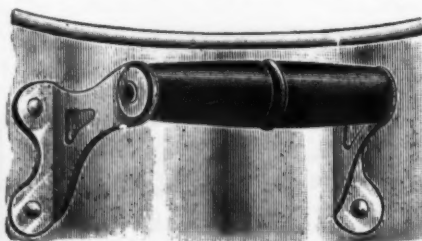


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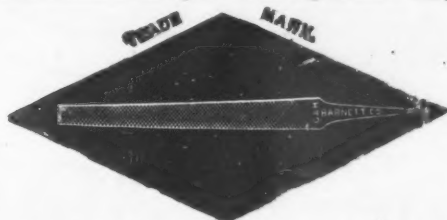
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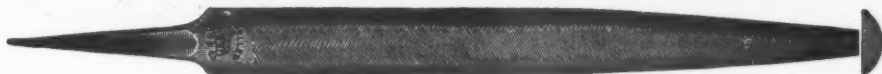


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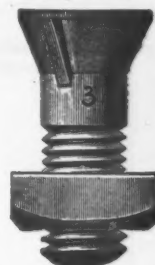
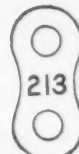
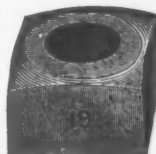
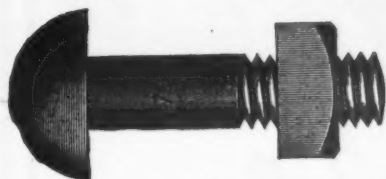
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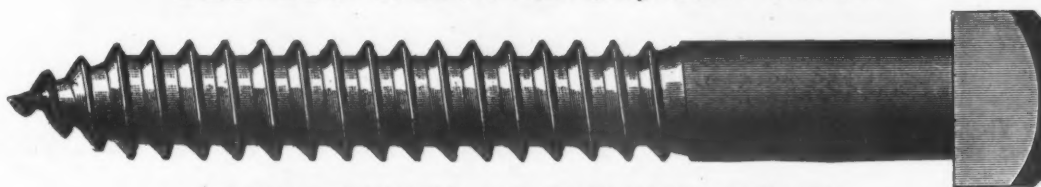
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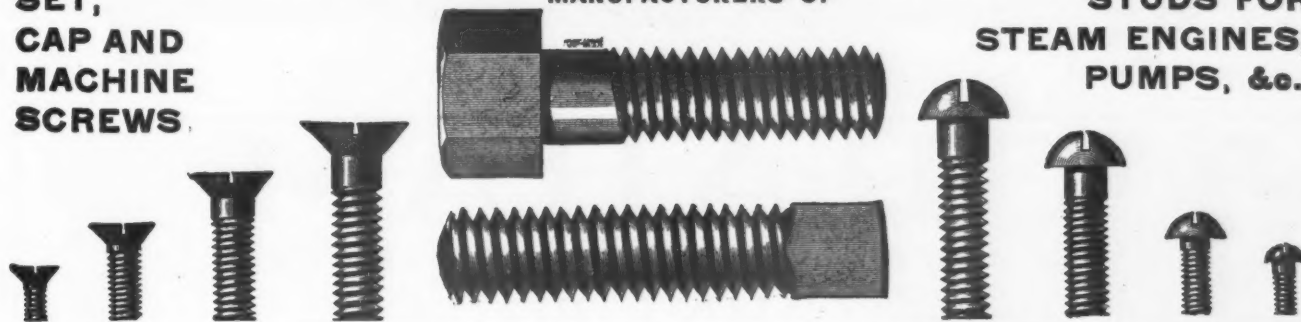
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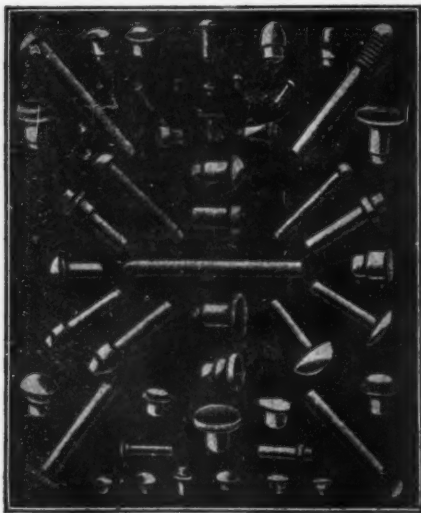
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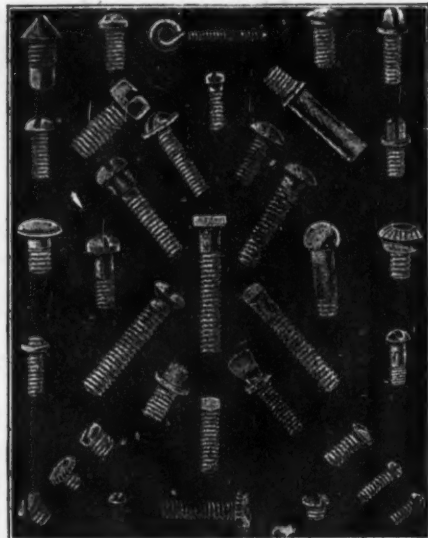
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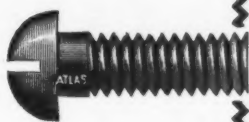
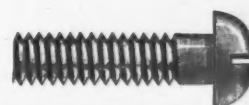
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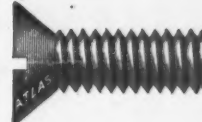
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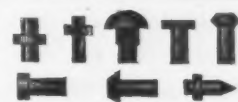
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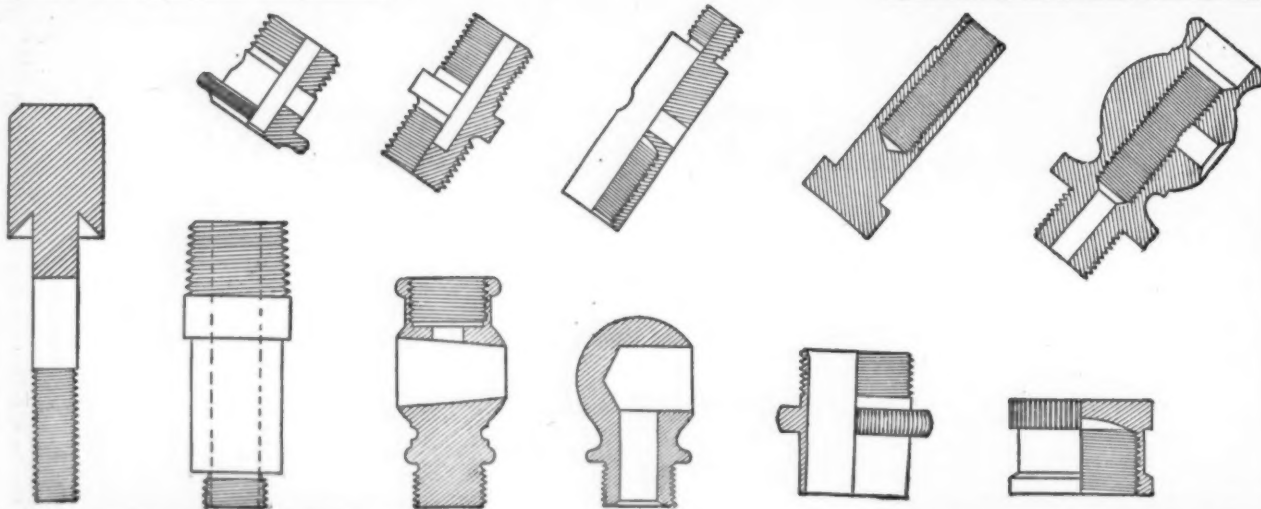
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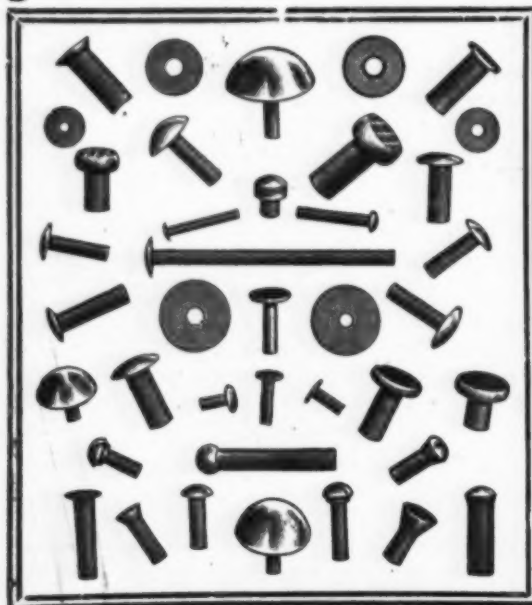
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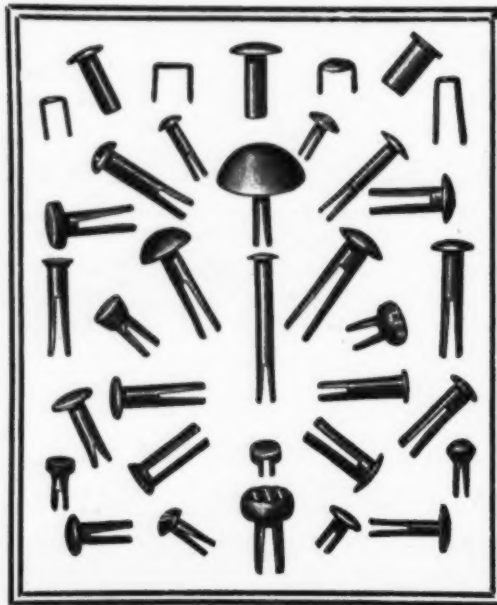
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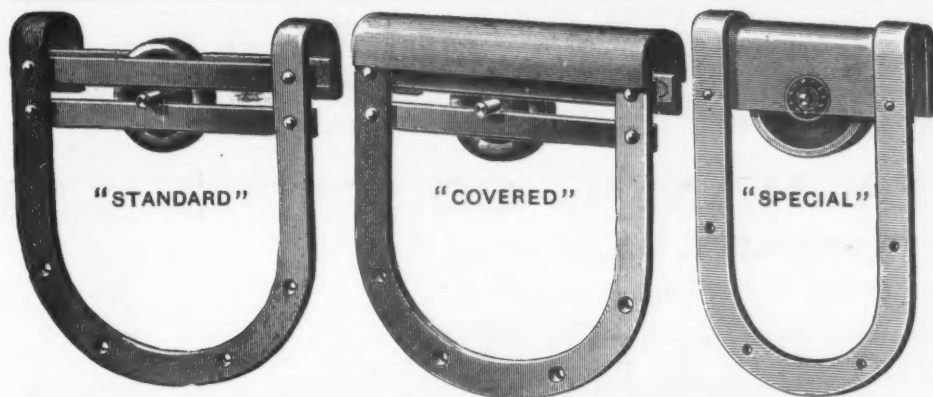
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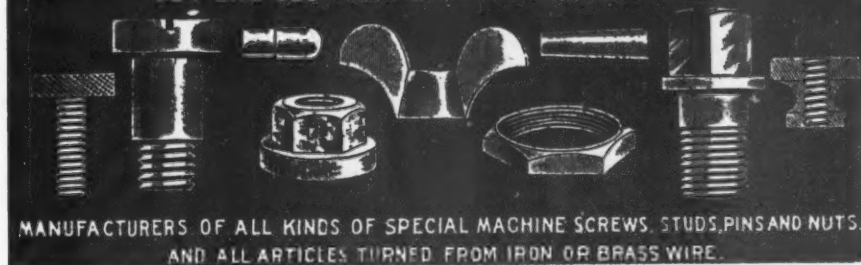
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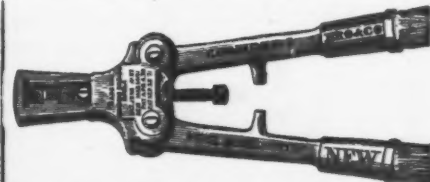
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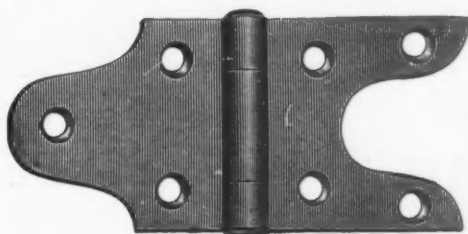
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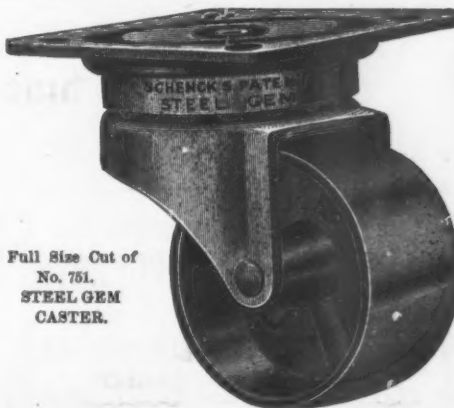
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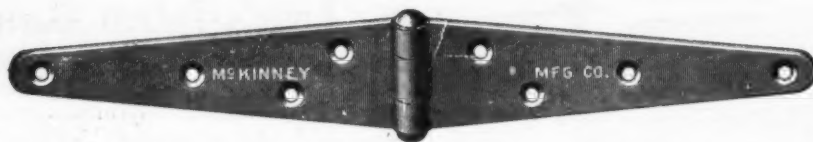
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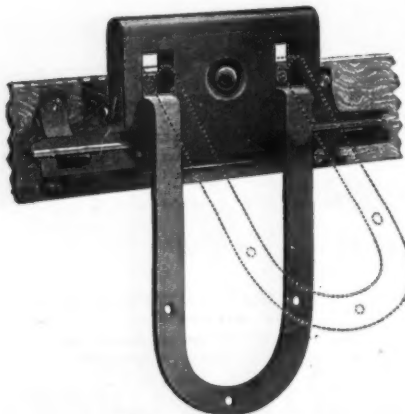
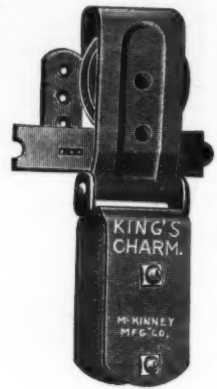


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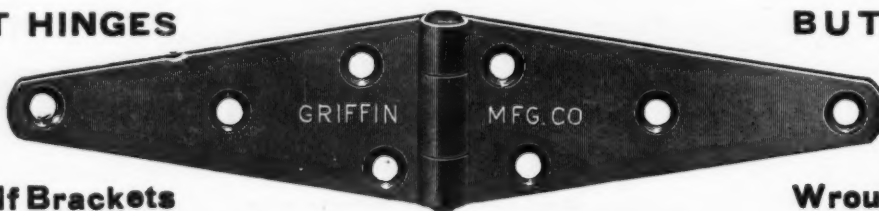
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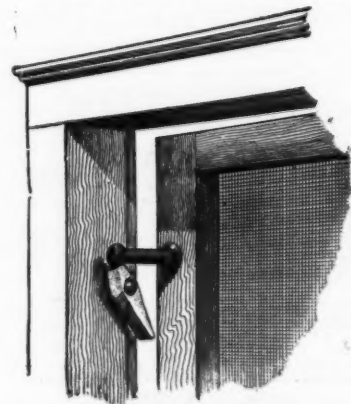
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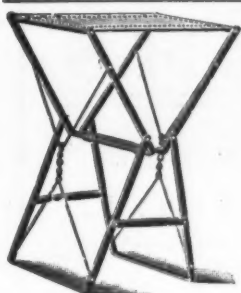
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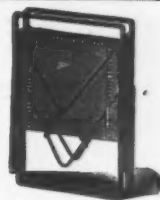
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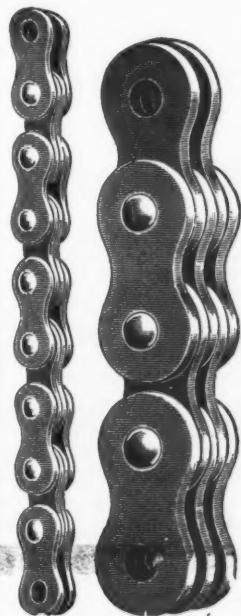
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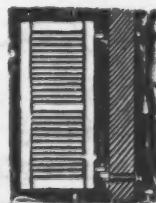
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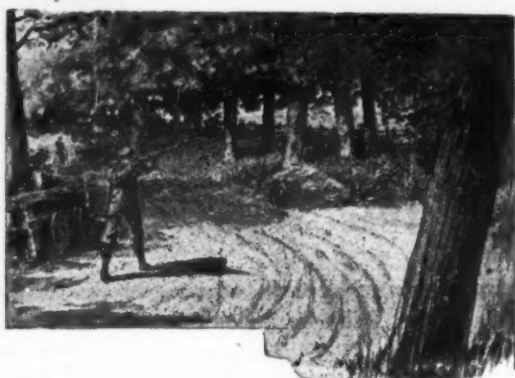
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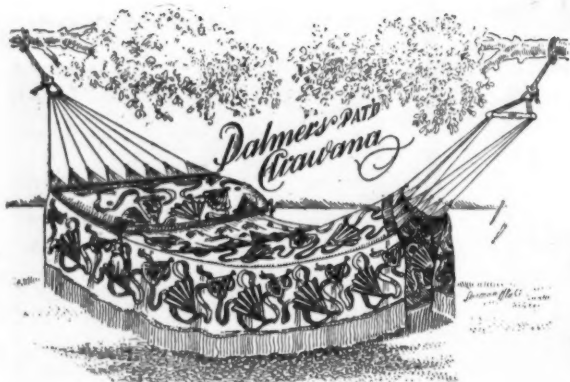
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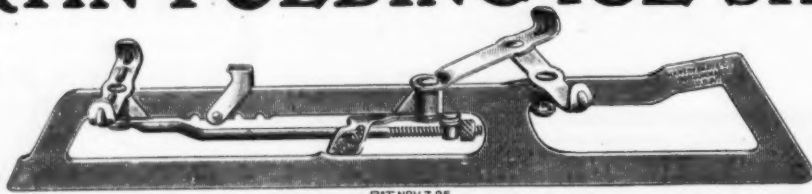
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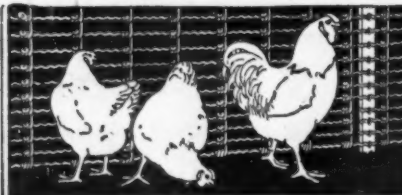


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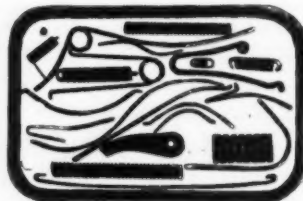
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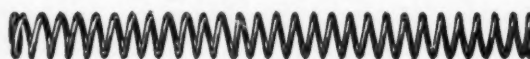
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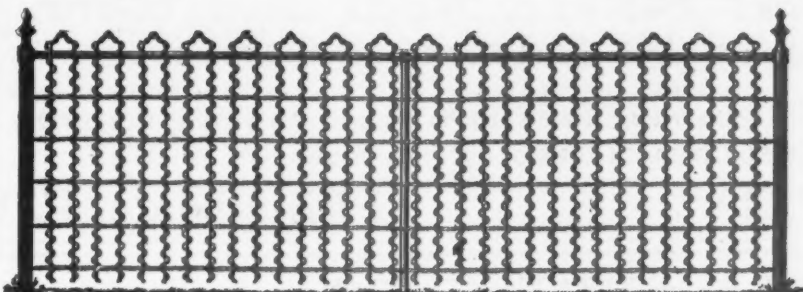
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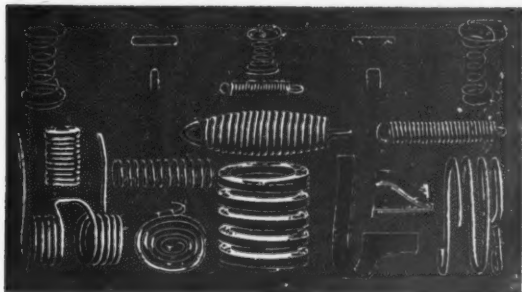
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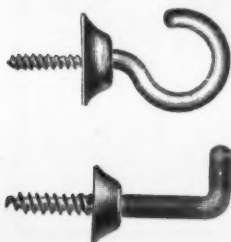
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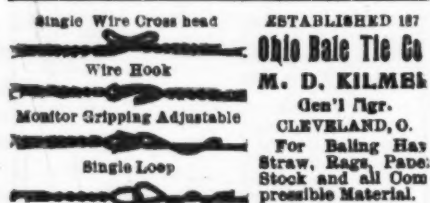
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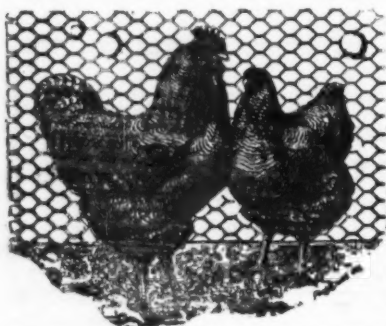
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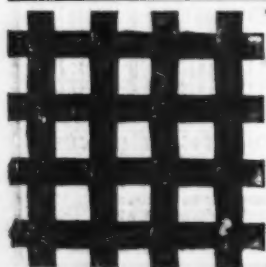
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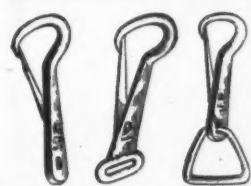
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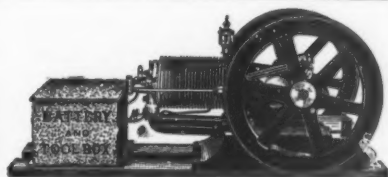
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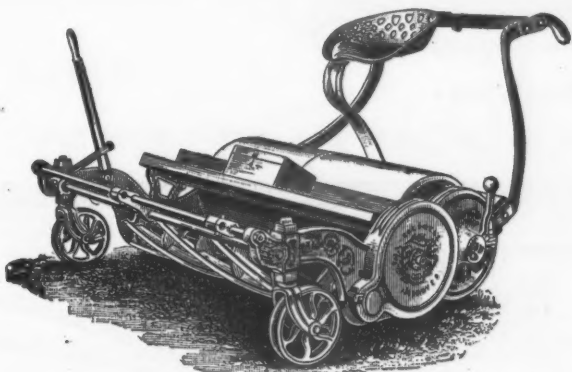
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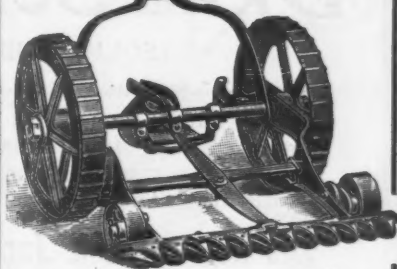


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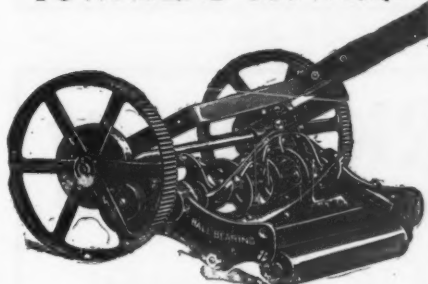
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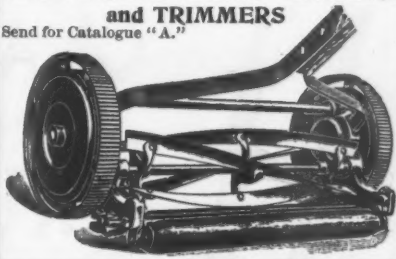
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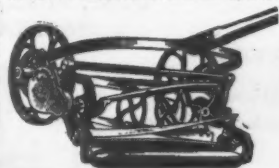


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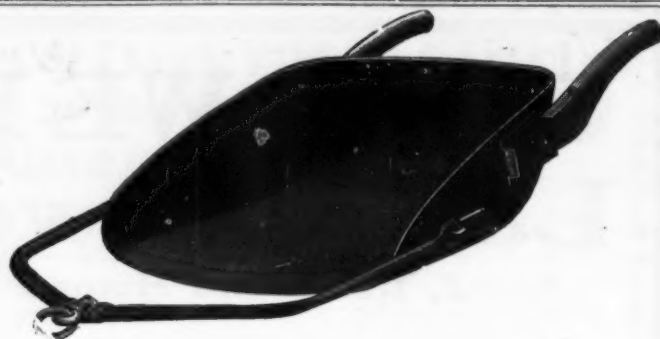
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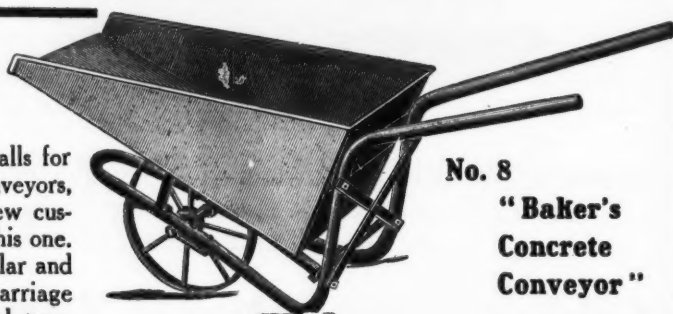
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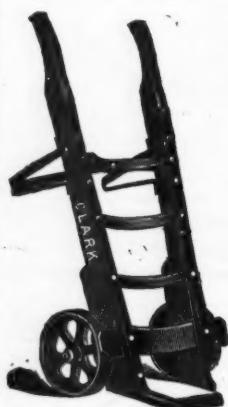
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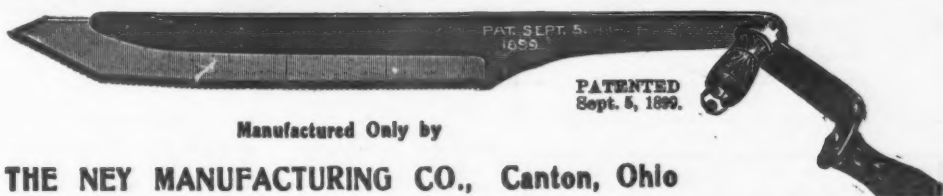
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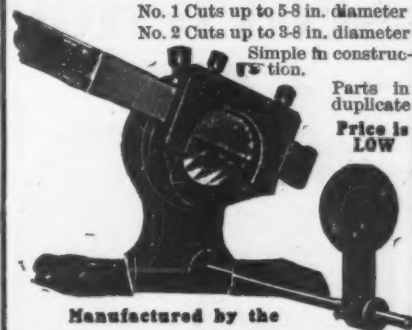
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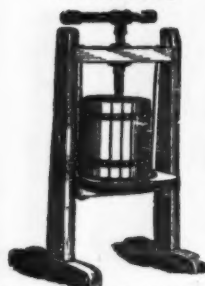


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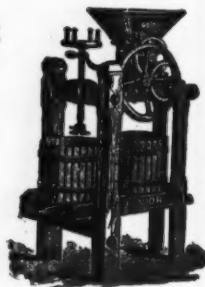
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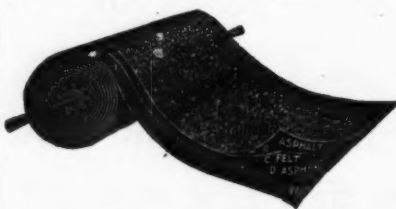
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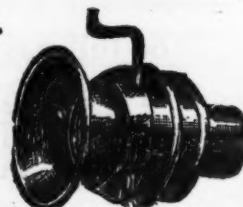
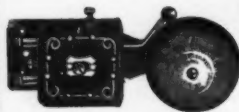


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The oldest paper in the world devoted to the interests of the Hardware, Iron, Machinery and Metal Trades, and a standard authority on all matters relating to those branches of industry.

ISSUED EVERY THURSDAY MORNING.

Subscription, postpaid, \$5.00 a year.

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 Columbus Forge & Iron Co. 130
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 Jones, Jesse Paper Box Co. 151
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- Kankakee Mfg. Co. 40
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Lea, J. Tammall & Co. 31	National Mfg. Co. 171	Pratt Chuck Co. 80	Smith, M. B. Co. 125	
Leaf, E. B. & Co. 124 & 125	National Pipe Bending Co. 55	Pratt & Whitney Co. 81	Smooth-On Mfg. Co. 89	
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Lufkin Rule Co. 124	Nichols, Wm. Co. 84	Republic Iron & Steel Co. 16	Stearns, W. H. Stamping Co. 8	
Lukens Iron & Steel Co. 61	Niles Cement-Pond Co. 116 & 130	Revere Drop Forge Co. 47	Steel Foundry Co. 125	
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McNab & Barlin Mfg. Co. 67	Ohio Brass Co. 5	Rogers, Jno. M. Wks. 78	Stuart & Peterson Co. 151	
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Mallory Mfg. Co. 173	Oneda Community. 155	Russell Economical Furnace Co. 46	Swindell, W. & Bros. 37	
Manning, Maxwell & Moore, Inc. 118	Oneda National Chuck Co. 82	Ryan, J. J. & Co. 2	Syracuse Chilled Plow Co. 185	
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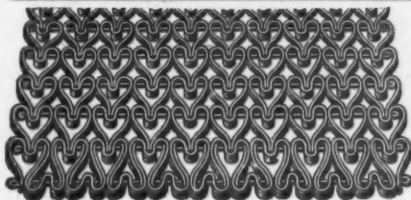
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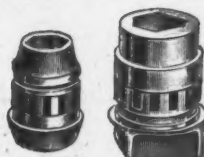
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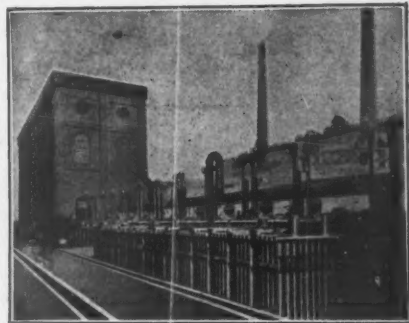
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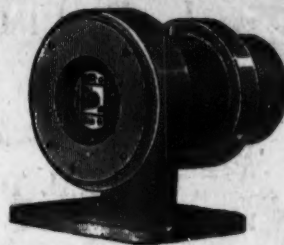
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